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SCIENTIFIC AMERICAN.

Building Edition.



A RESIDENCE AT WILLIAMSBRIDGE, N.Y.

NO III.

JANUARY 1895.

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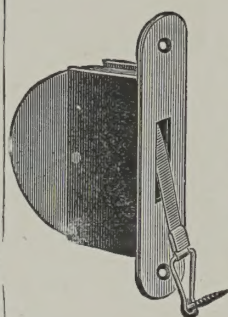
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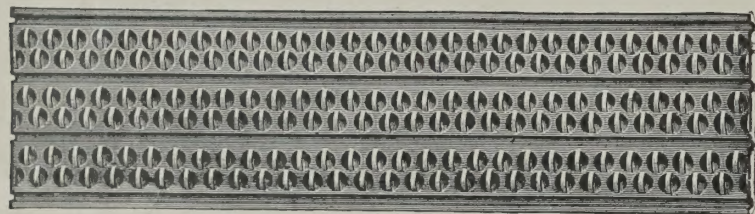
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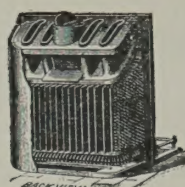
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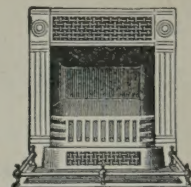
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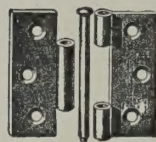
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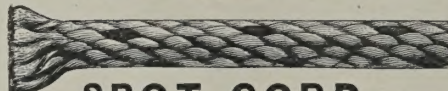
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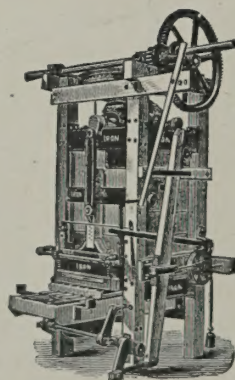
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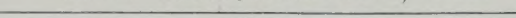
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No. 1.

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A RESIDENCE AT WILLIAMSBRIDGE, N. Y.—See page 2.

Scientific American.

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No. 361 BROADWAY, NEW YORK.

O. D. MUNN.

A. E. BEACH.

NEW YORK, JANUARY, 1895.

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Of the January number of the

SCIENTIFIC AMERICAN, BUILDING EDITION.

(Illustrated articles are marked with an asterisk.)

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A RESIDENCE AT WILLIAMSBRIDGE, N. Y.

Our plate in colors, given on the front cover, illustrates the residence of Charles H. Love, Esq., at Bronxwood Park, Williamsbridge, N. Y. An additional view and plans are given on pages 1 and 3. Our illustrations show a Colonial cottage, of pleasing exterior appearance and thoughtful interior arrangement. Dimensions: Front, 42 ft. 8 in., exclusive of pantry extension; side, 31 ft. 4 in., not including the 7 ft. 6 in. piazza. Heights: Cellar, 7 ft. 2 in.; first story, 9 ft. 4 in.; second, 9 ft.; third, 8 ft. 6 in. The underpinning is of brick, with bluestone sills to windows. The exterior framework is covered with sheathing, building paper and clapboards for first story; second story and roof shingled, the latter left to weather; other shingles stained brown; clapboards, Colonial yellow; trimming color, white; window frames, olive green; shutters, Indian red; sash, etc., white. The well shaded piazza, overhanging balcony with its frieze ornamentation of putty wreaths and festoons, flat deck with balustrade on top and wavy band of shingles, are pleasing features. The plan shows an entrance hall, 4 ft. wide, with plaster arches supported by ash columns, to parlor and at staircase hall; sliding doors to reception room, which opens into dining-room, with broad arch. Kitchen complete, with all conveniences, including dumbwaiter to laundry below, generous pantry and dresser room, and back staircase to general landing halfway to second floor. This is lighted by a triple-stained glass window, two stationary and one hinged. Second floor shows four good-sized chambers, with plenty of closet-room. Bath complete with all fixtures, plumbing exposed. Attic has two rooms finished off. Finish: Hall, ash; rest, white pine; hard oil in principal rooms. Cellar, cemented, contains laundry, steam-heating apparatus and full storage. Cost complete \$4,250. Arthur Curtis Longyear, architect, 126 Liberty Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT NEW ROCHELLE, N. Y.

The engravings, pages 4 and 5, illustrate a dwelling recently erected for J. O. Noakes, Esq., at Iselin's Park, New Rochelle, N. Y. The design, Colonial in treatment, is pleasing, and the floor plans show an excellent interior arrangement. The underpinning is built of rock-faced stone, laid up at random in white mortar. The exterior framework is sheathed, and then covered with shingles and left to weather finish. The roof is also shingled. Dimensions: Front, 40 ft. 6 in.; side, 39 ft. 6 in. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in. The hall is finished in oak. It contains an ornamental staircase turned out of natural oak, a hardwood floor of oak, highly polished, and an open fireplace, with tiled trimmings and an oak mantel. Parlor and library are finished in mahogany, and each contains an open fireplace built of brick, with tiled facings and a mantel of solid mahogany, with columns and mirror. Dining-room is finished and treated in a similar manner. Kitchen and pantries are trimmed and wainscoted with narrow beaded yellow pine, and finished natural. These apartments are furnished with all the necessary fixtures. The second floor is provided with four bedrooms, seven closets, bathroom, den, balcony, loggia and three open fireplaces. Bathroom is wainscoted with narrow-beaded stuff, and fitted up with the usual conveniences. A trap-door gives access to ample storage in attic. Cemented cellar contains furnace and other necessary apartments. Cost \$5,000 complete. Mr. Manly N. Cutter, architect, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT MONTCLAIR, N. J.

We present on pages 8 and 9 a residence erected for Sylvester Post, Esq., at Montclair, New Jersey. The design is of Colonial treatment, and is most complete; it combines both pleasing elevations, with spacious piazza and bay windows, and well arranged floor plans, which are finished on the interior in a most excellent manner. The foundation and underpinning are built of rock-faced red sandstone, laid up in red mortar. The exterior walls are covered with matched sheathing and paper, and then shingled and painted a pearl gray, with white trimmings. The roof is also shingled and finished natural. Dimensions: Front, 40 ft. 8 in.; side, 67 ft., not including piazza and porch. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The main hall, both upper and lower floor, is trimmed with oak. It has a paneled wainscoting, hardwood floor, and an open fireplace, built of Tiffany brick, with facings and hearth of same, and a carved shelf of oak. The staircase is an ornamental one, with carved newel posts, and is lighted effectively by a bay-window thrown out at first landing and glazed with stained glass. The parlor is trimmed with cherry, and the library and dining-room are trimmed with oak. The latter have oak floors highly polished, and open fireplaces, built of Tiffany brick and provided with massive carved mantels. Kitchen and pantries are trimmed and wainscoted with whitewood, finished natural, and each apartment is furnished with the usual fixtures complete. The second floor contains four

bedrooms, bathroom and servant's bedroom and bath, besides many closets. The bathrooms are paved and wainscoted with white English tiling, and are fitted up with exposed plumbing. The third floor contains three bedrooms and ample storage. Cemented cellar contains furnace, laundry, coal bins, cold storage and other necessary apartments. Messrs. Wilbur S. Knowles and Alfred H. Thorp, architects, 21 West Twenty-fourth Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A SEASIDE COTTAGE.

We publish on pages 6 and 7 a seaside cottage recently erected for C. H. Manning, Esq., at Kennebunkport, Maine. The building is picturesque and is most unique. It is designed after the old "New England" lean-to roof order, giving all the apartments on two floors, with low ceilings and large, open fireplaces. The principal feature of the exterior is the bay-window, chimney and underpinning, built of rock-faced field stone laid up at random. The remainder of the exterior is built of wood and covered with shingles, and stained mahogany color. The roof is shingled and stained similar. Dimensions: Front, 70 ft.; side, 34 ft., exclusive of piazza. Height of ceilings: Cellar, 6 ft. 6 in.; first story, 9 ft.; second, 8 ft. White pine and spruce are the only woods used. The frame is well placed, and covered with matched and beaded stuff throughout the interior. The ceilings are framed with large beams, with small ribs between same; the wall beams are spaced to show in a similar manner. The hall contains an ornamental staircase and a paneled divan. Drawing-room is separated from hall and dining-room by archways with spindle transoms. It is furnished with paneled seat in bay window, and a large, open fireplace, built of long thin Perth Amboy bricks, with facings and hearth of same, and finished with a hardwood mantel. Dining-room is well lighted. Kitchen, pantries, closets, shed and maid's room are fitted up with the usual fixtures in the best possible manner. The second floor consists of six bedrooms and seven closets. Mr. Henry Paston Clark, architect, Boston, Mass.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT EAST ORANGE, N. J.

The foundation of this building, illustrated, on page 15, is constructed of rubble stone, forming the basement story; the superstructure is framed and covered with sheathing and first quality siding of white pine, the roof being shingled. A piazza runs across the front and halfway down one side of the building, forming a balcony for second story, supported on circular wooden columns. The first story consists of a parlor, opening from the staircase hall, and separated from the library by double sliding doors. The dining-room has a large single sliding door opening into the library, both rooms communicating directly with the main hall. On the left is a small study, with space under stairs for a safe, and a large, well lighted closet, also forming passage to dining-room. The outside wall of dining-room is filled with three large windows, flooding it with light, the mantel occupying an opposite angle. Passage from kitchen is through butler's pantry, both doors being double hinged; there is also a kitchen pantry and closet, with rear staircase leading to basement and second story. In rear of library is a conservatory, with glass roof and sides. The main hall and stairs and library are finished in quartered oak, the dining-room in sycamore, and parlor in bird's eye maple. These rooms are plastered with sand finish, and decorated in water color. The floors are quartered oak. Plumbing throughout is thoroughly trapped and well ventilated. The second story is arranged for three large bedrooms, a sewing-room, servant's room and bathroom. An alcove adjoins the principal chamber, with a plaster arch between all rooms, open directly on the halls, which are well lighted. The bathroom contains W. C., bath and oval shaped basin. There is ample space for closets, and a staircase to attic over main stairs. The interior is painted a dark gray, with white trimmings. The cost is \$7,000. The architect was W. F. Bower, Newark, N. J.

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THE FIRST PRESBYTERIAN CHURCH, STAMFORD, CONN.

The engravings presented on pages 10 and 11 illustrate the First Presbyterian Church, at Stamford, Connecticut. This church has been erected through the untiring efforts of its rector, the Rev. Dr. R. P. H. Vail, who has the honor of being instrumental in building up one of the finest places of worship in the State. The new building, of great architectural beauty, is treated in the Romanesque style, and it is constructed of the best materials, and is finished in a thoroughly substantial manner. The exterior walls are all built of local granite, from the "Strawberry Hill" quarries. This stone is of a grayish blue color, and the faces are left rough as they come from the quarry. The roof is covered with slate and red tiles. The main entrance is marked by a tower with porch and porte-cochère. On entering the auditorium, eight columns, so disposed, are seen, having elaborately carved capitals; these columns support the "lantern" in roof, which is an excellent feature, giving both light and ventilation. The pulpit recess is separated by a broad arch, and is elevated above the auditorium floor some four steps. Back of the pulpit is the organ loft, and at the left the choir stall. The pulpit and organ are turned out of mahogany, and are carved in a handsome manner. The whole tone of color is most exquisite. The auditorium is wainscoted in panels five feet in height, and is painted a dull shade of bottle green. The walls above

the shingles are stained an Indian red, and blended down into different tones of red into a dark yellow, and ending on top of stonework with a light yellow, giving somewhat the effect of a sunset. The height of stories: Cellar is 7 ft.; first story, 9 ft.; second story, 9 ft.; third, or attic, 8 ft. The interior throughout is finished in whitewood, natural, except the dining-room, which is stained mahogany. The house is well planned, with good furniture space and large closets. The plumbing throughout is all open and nickelplated. The walls throughout are plastered with King's Winsor cement. There are two bedrooms in attic, and trunk-room. Cellar is divided into furnace, coal, vegetable, and laundry apartments, with cement floor. Cost of house complete, including plumbing and gas fitting, heating, mantels, tiling and stained glass, was less than \$5,000. Architect, E. G. W. Dietrich, 18 Broadway, New York, N. Y.

Our engraving was made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

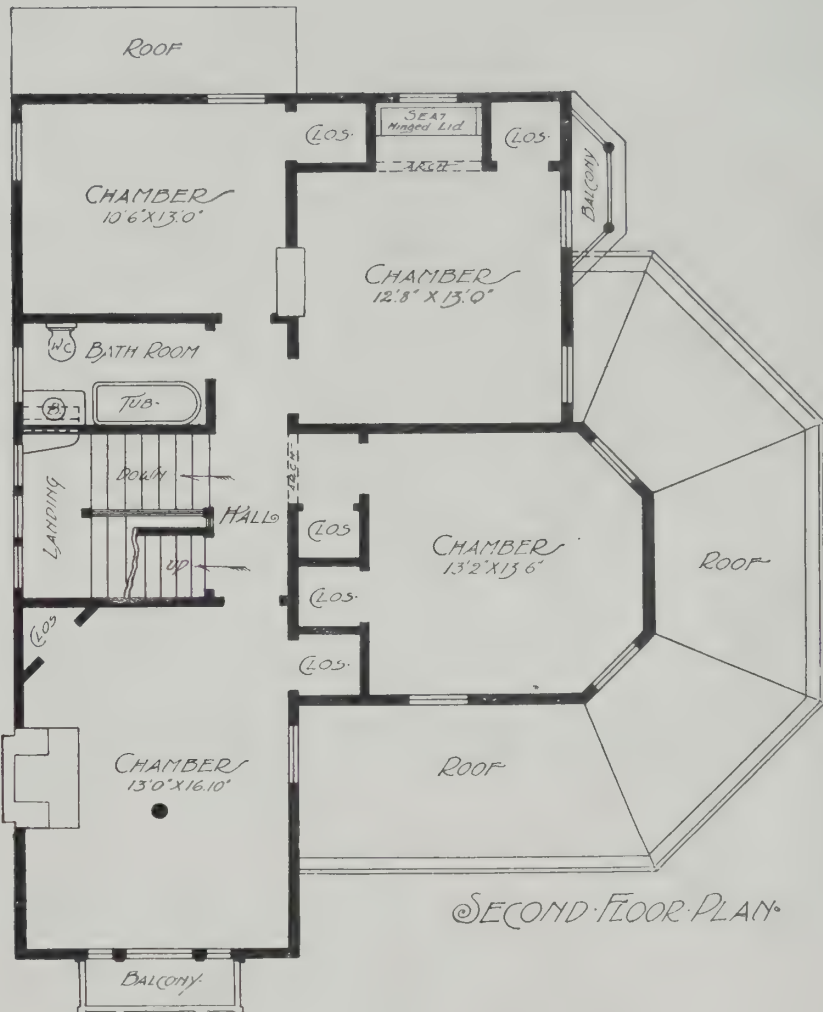
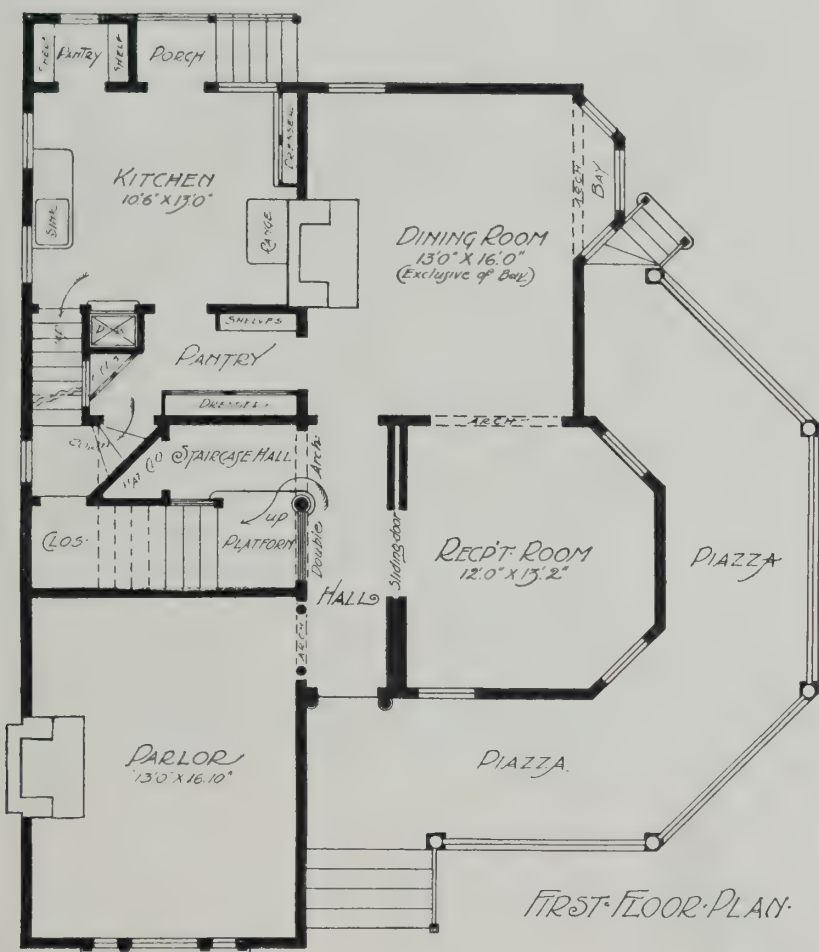
A SUMMER RESIDENCE IN MAINE.

We publish on pages 12 and 13 illustrations of a summer residence recently erected for S. W. Thaxter, Esq., at Cushing's Island, Maine. The design presents an excellent example for a summer home, and it has many at-

Buff Brick Popular.

Since buff brick and iron building frames came to town the use of the old-fashioned red brick has been much curtailed. Nevertheless, red brick is still the most important building material in use hereabouts, as it is still by far the cheapest for ordinary structures. The buff brick took the place of the red pressed brick as a material for fronts, and hollow brick has taken the place of ordinary red brick as filling for walls framed with iron skeletons. The buff brick costs about the same as the pressed brick, and so has come to take its place in buildings of an expensive character. The buff brick has also driven out brownstone to some extent, though the latter still has a great vogue in apartment houses. This stone has in thirty years been deposed from its place as the chief ornamental material for expensive dwellings, and now is used to give a thin veneer of elegance to cheap structures. As thus used it is a flimsy material, because it is set with its lines of cleavage vertical, and is thus rapidly destroyed by the action of the elements. The Vanderbilt houses have walls of solid brownstone laid on its bed, as the phrase is, which means with the plane of cleavage horizontal. Thus laid the stone is fairly durable.

Buff brick has long been used in the West, chiefly because the clays in much of the region beyond the Alleghanies burn buff instead of red. It is the presence of iron that gives a red brick. Milwaukee used to send buff



A RESIDENCE AT WILLIAMSBRIDGE, N. Y.—See page 2.

are treated in a similar manner of a lighter coloring. The pews and furnishings are of mahogany, and they harmonize most excellently with the color scheme. The auditorium is lighted effectively by many stained glass windows of memorial design. The study is conveniently located and fitted up complete. The Sunday-school and class-rooms are well lighted and furnished complete. The library for books is a convenience. The parlor is provided with a dumbwaiter running to kitchen and cellar. These apartments are so arranged as to be separated or thrown together at pleasure, and are wainscoted and trimmed in a similar manner. The cellar contains furnace, kitchen, pantry and dumbwaiter. Mr. J. C. Cady, architect, New York, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT SCRANTON, PA.

We illustrate on page 14 a residence built in North Park, Scranton, Pa., for Mr. E. B. Sturges. The treatment is somewhat out of the usual for a small house of moderate cost. The design is satisfactory. Much depends on the color effect, which is particularly pleasing in this house. The stonework is broken ashlar local stone, of mottled effect of yellow and red, which is very pretty in a mass, such as in the walls, and, broken off at different heights, gives it a very picturesque effect. The superstructure is of shingles. The roof is stained an Indian red. The side walls are blended from the ridge;

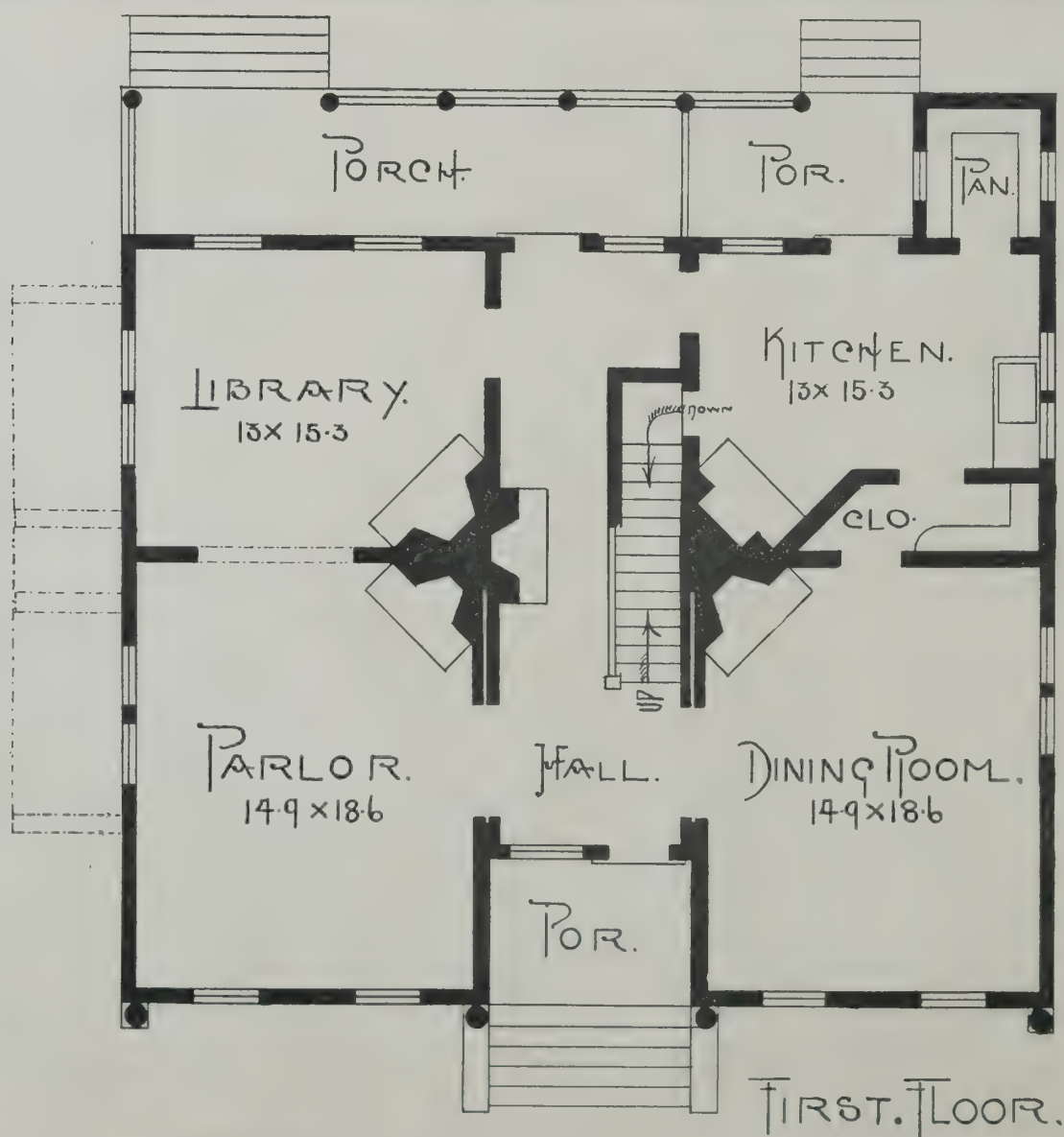
tractive features, including a spacious and well-shaded piazza, loggia and balcony, and also a bay window with seat. The underpinning is built of rock-faced field stone laid up at random, while the building above is built of wood, and the exterior walls sheathed and covered with shingles, and stained a mahogany color. The roof is shingled, and painted red. Dimensions: Front, 36 ft.; side, 39 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft 6 in.; third, 7 6 in. The living room is a unique apartment. The studding to walls and the ceiling timbers are left exposed to view, and are stained cherry, the space between being plastered and treated in olive yellow. All woodwork is finished in cherry. The newel post at staircase extends to ceiling, and the space between is provided with a screen filled in with spindlework. The nook is a special feature, with corner seats and an open fireplace built of brick, with hearth laid of same and a mantelshelf of wood. Dining-room has a bay window, paneled divan and an open fireplace. Kitchen and pantry are ceiled up with narrow beaded yellow pine, finished natural, and are furnished replete. The second floor is plastered, and all woodwork is stained and finished in cherry. This floor contains four bedrooms and bathroom. Third floor contains two bedrooms and storage. The cellar has an entrance from kitchen, and one from the outside thereto. Cost \$3,100 complete. Mr. John Calvin Stevens, architect, Oxford Building, Portland, Me.

Our engraving was made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

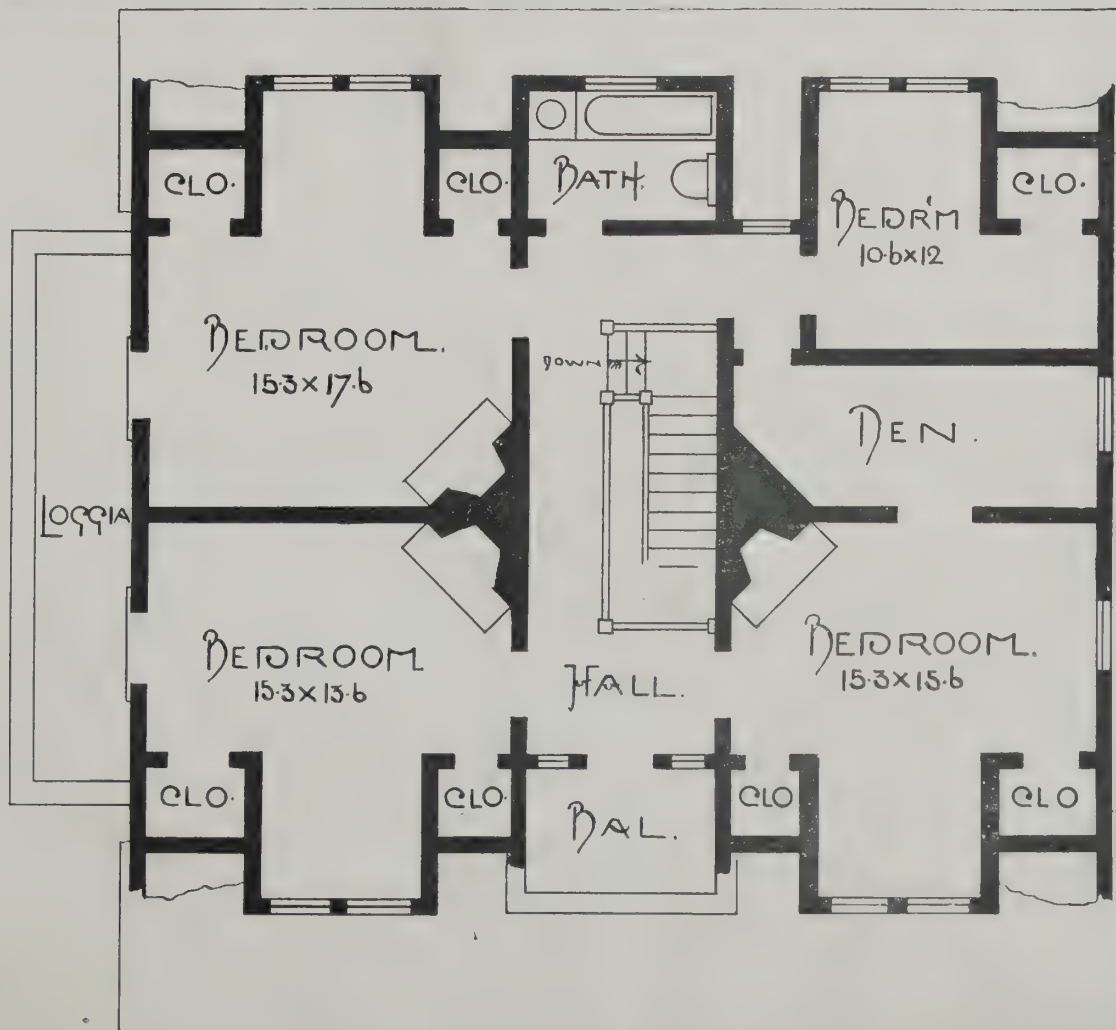
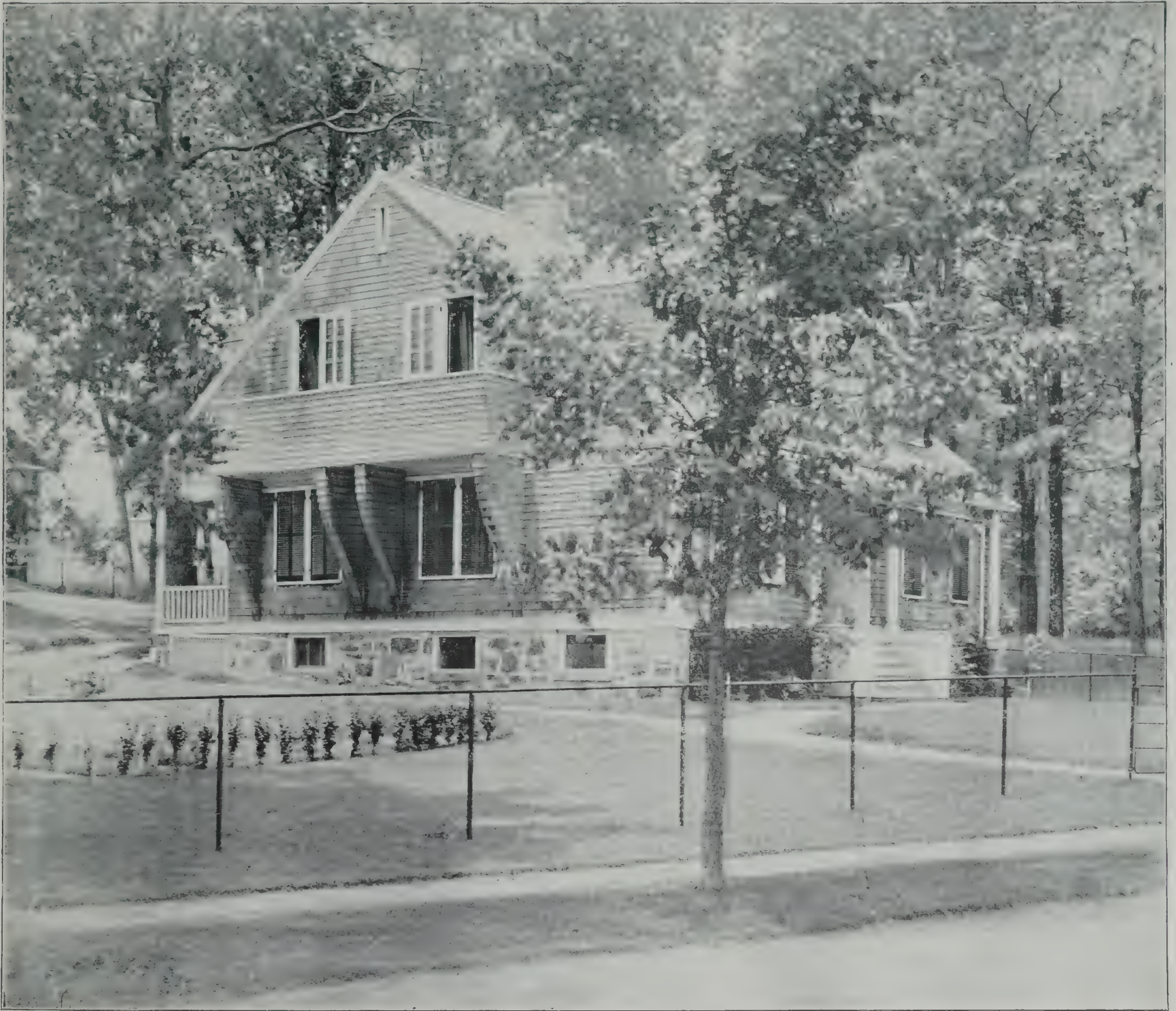
brick to New York, but most of the local supply now comes from New Jersey and Staten Island. The earliest important structure of buff brick in this city was the Telephone building, in Cortlandt street, and for some years Telephone brick was the name the material went by in the trade. The speckled bricks of that structure have been more popular than the somewhat pasty-looking smooth buff bricks. The speckles are obtained by grinding pig iron and mixing it with the clay. The speckled buff bricks are sometimes made extremely long and thin, when they are called Pompeian.

The buff brick is made of a fire clay, and is more durable than the red. It is notably more durable than the pressed brick for which it has been substituted, since the pressed brick, as the name indicates, is made under pressure, and has in consequence a tendency to flake at the surface. The most notable buff brick structure in town is the Madison Square Garden, and the peculiar ornamental arrangement of the bricks in the tower has been imitated in humbler structures. Since the tower rose, several charity buildings, hospitals, and the like have been built of buff brick. Had the design of making offices in the tower been carried out, the public would have been made even more familiar with the structure, and doubtless the popularity of the buff brick would have been increased. When the plan of the offices, the clock, and the bell shall have been fulfilled, the tower and its material will be more popular than ever.—N. Y. Sun.

THE work of construction of the tomb of General Grant, New York City, is now satisfactorily progressing.



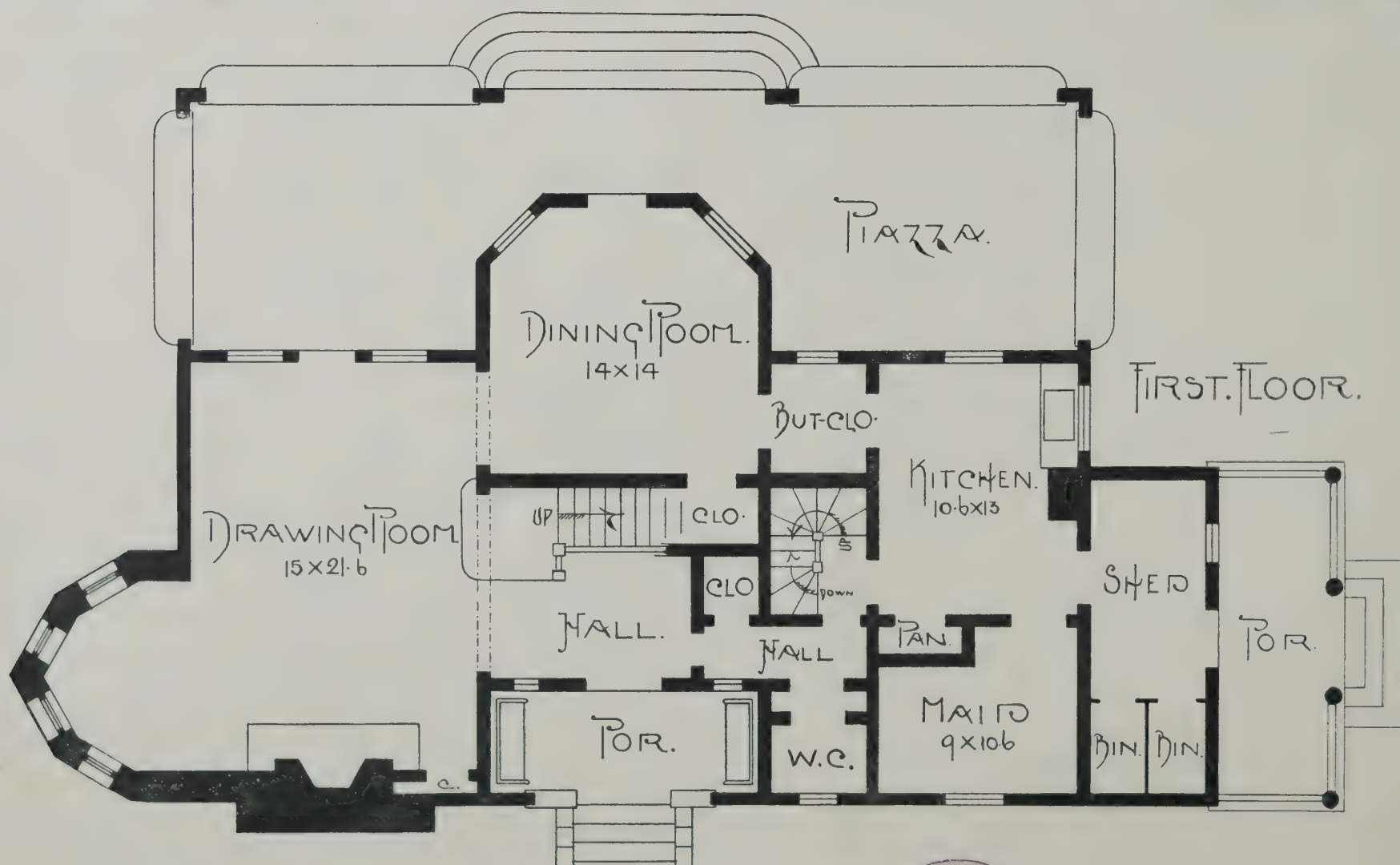
A RESIDENCE AT NEW ROCHELLE, N. Y.—See page 2.



SECOND FLOOR.

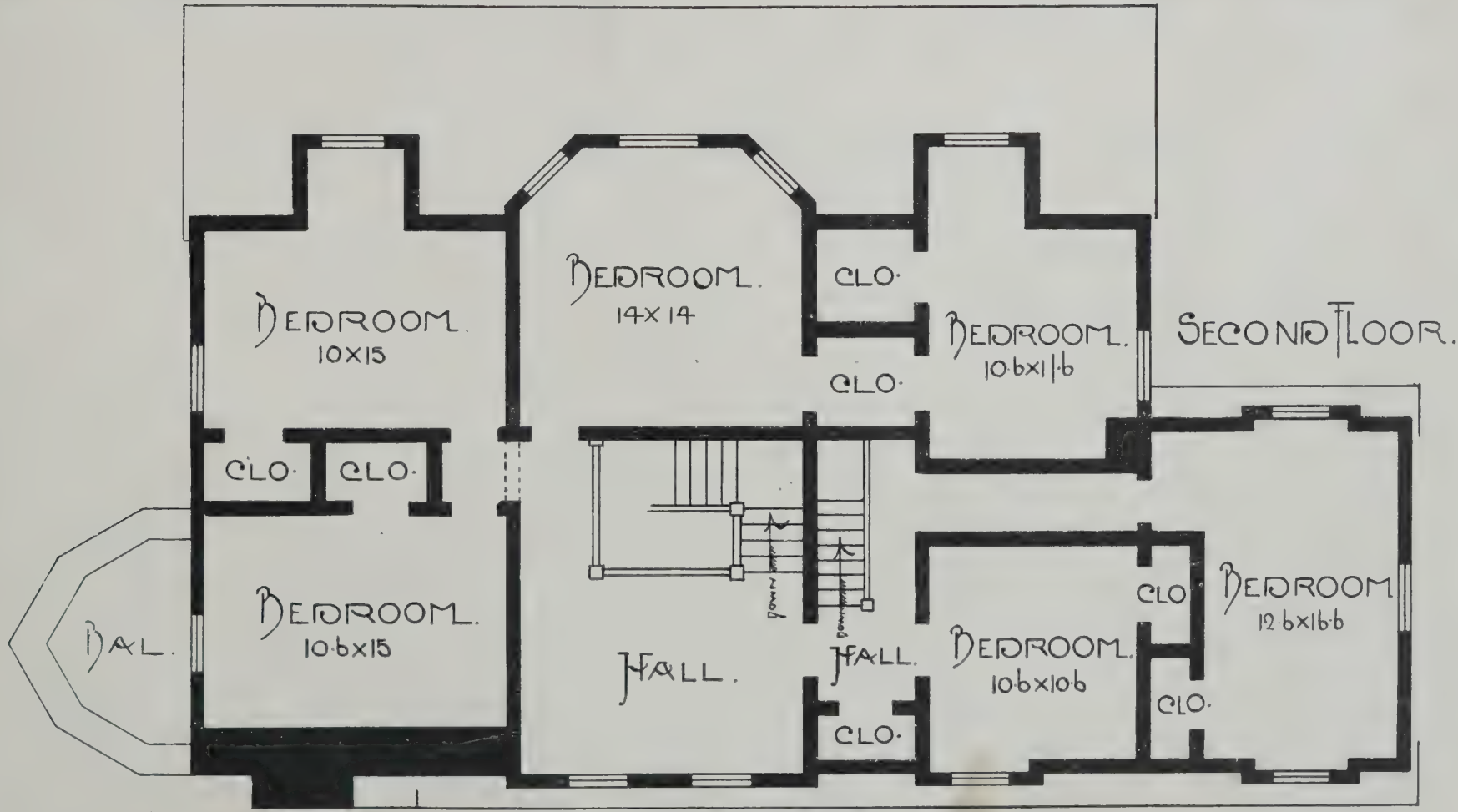
A RESIDENCE AT NEW ROCHELLE, N. Y.—See page 2.





A SEASIDE COTTAGE.—See page 2





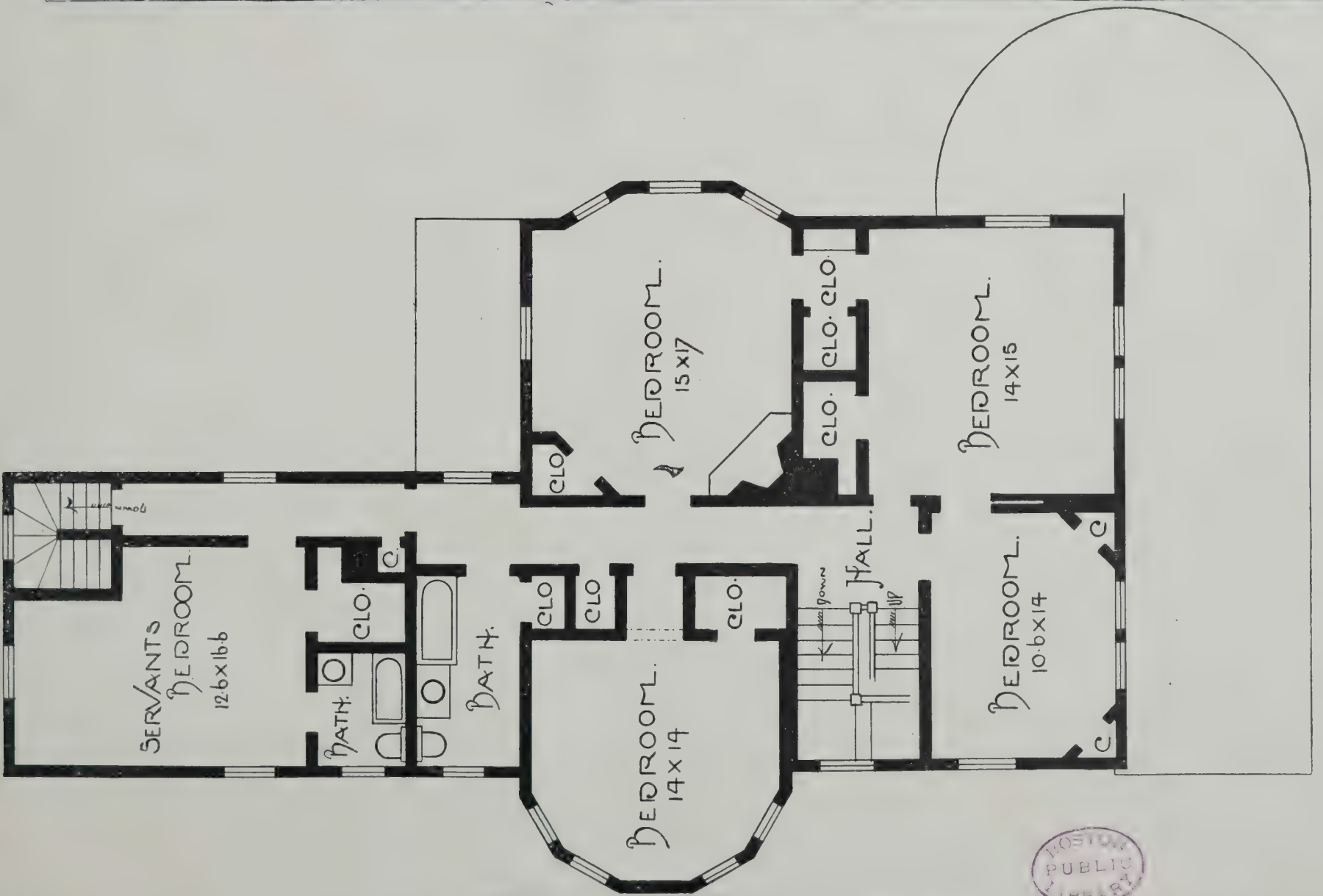
A SEASIDE COTTAGE. See page 2.





A RESIDENCE AT MONTCLAIR, N. J.—See page 2.





SECOND FLOOR.

A RESIDENCE AT MONTCLAIR, N. J.—See page 2.





THE FIRST PRESBYTERIAN CHURCH, STAMFORD, CONN.—See page 3.

Ceiling and Cornice Tinting.

However self-confident and decided the average customer may be concerning the color and treatment of the side walls of an apartment, the painter-decorator usually has a prominent voice in arranging the cornice and ceiling finish, says Frederick Parsons, in the *Western Painter*. Probably two things account for this, viz., that a ceiling is popularly considered of minor decorative importance; and, again, the technicalities involved can only be properly grasped by the practical man. Every ceiling has a kind of "individuality," so to express it; since the nature and condition of two old plastered ceilings are seldom exactly alike, while their decorative requirements invariably differ with the room and its uses.

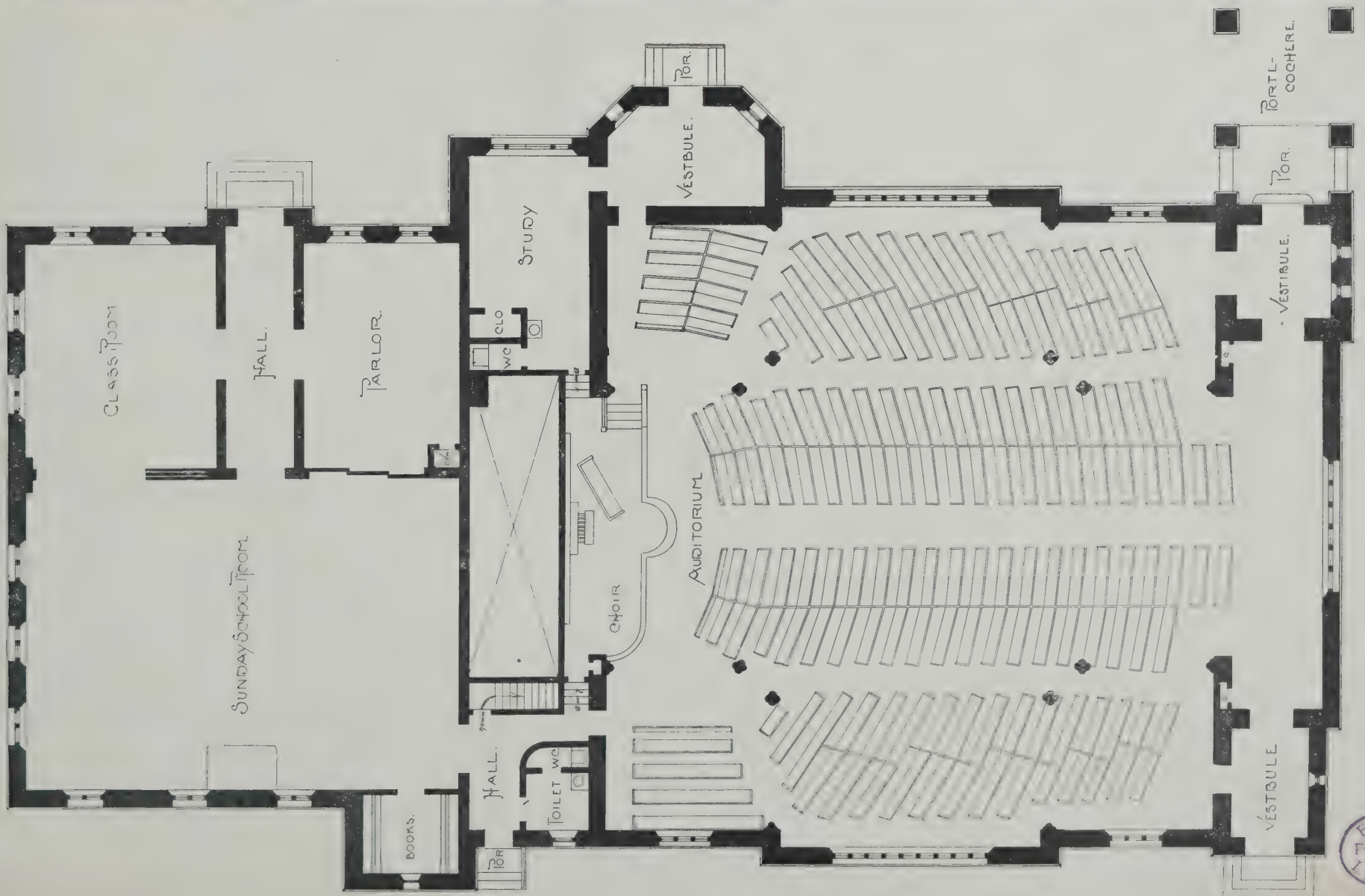
Although the decorative aspect of my subject opens an almost exhaustless field for study and observation, I think a few notes on the every-day side of this work will prove more useful just now. Kalsomine, or distemper, whichever we prefer to term it, is without doubt the cheapest, most sanitary and economic finish for ordinary plaster ceilings. In a new house, the least regard we can give to the ceilings is to treat the chambers, kitchen, etc., white, whilst the hall and "reception," or living, rooms should be tinted. There is no advantage, neither material nor decorative, in tinting all ceilings alike. If the dining room, parlor and hall cannot be finished with regard to the particular wall color of each, then they are best done ivory white; and both the white and the tinted ceilings will enhance the value of the other. By ivory white I mean a decided, soft, creamy tint made by raw sienna. Although this latter pigment will vary much in shade and hue, its tints with whiting are always pleasing. When ready ground in water, I have found that it does not dissolve and mix with our soaked whiting so easily as a finely-ground, dry sienna. Compared with ochre, the raw sienna may seem rather costly; but the small amount required and the superior strength and tint of sienna far outweigh this consideration. This ivory-white tint

is, without doubt, the safest for any ceiling. No matter what may be put on the walls—blue, red, green or yellow—it suits all equally well, because its soft, warm tint is so akin to the sunlit atmosphere. Unless new ceilings have been very indifferently plastered and troweled, with a consequent inequality of absorbency, one good coat of distemper should make a satisfactory job. With a ceiling more than twelve feet wide, a second man is advisable, unless we have direct knowledge that the surface will work very cool, and even then it is expedient. It will be found that much of the success of one coat ceiling work will depend upon the distemper and the manipulation. To finish with distemper in a warm condition, just made up, is to court poor results, since the glue will be absorbed into the plaster as readily as the water. When, however, the distemper is jellied sufficiently to spread nicely from the brush, then the size naturally keeps our work "cool," just as the addition of a little weak size to plaster holds it from immediately getting hard. Again, the spreading must be done generously as well as energetically, remembering that distemper should be handled just opposite to oil paint; in the former, one good coat is better than two thin ones, whilst with paint the reverse holds good. Distemper, again, needs no brushing of the "laying off" kind; it merely requires "laying on"—good, intelligent spreading, with short strokes in any direction, and using the tip of the brush. Another point I would lay stress on: the necessity of good whiting and glue. Much of the so-called whiting retailed for the commonest class of work would make better concrete than distemper. A recent specimen coming under my notice contained fully 50 per cent. of sand. If this so-called whiting were but one-fourth the price of good "gilder's," then it would be still a dear product; since whiting is like white lead, the finer it is prepared, and the whiter it is, the gain in color and quality is very marked. Although good brown glue may occasionally interfere with the purity of our tints, it answers for all average

work and tints of ivory, salmon, pink, etc.; but for delicate and particular hues of gray, lavender, blue, lilac, etc., I would advise the use of the best white glue, or else the admirable up-to-date substitute, glutol. Great as are the advantages of keeping pigments ground in oil, I do not think the same obtains with water colors. As a rule water ground pigments are ground much finer, and therefore are invaluable for fine fresco, graining or scene painting; but with ceiling distemper it is best to mix the dry color to a paste, in a small cup, with the bare hand and arm. When the desired tint is obtained, add the warm glue, strain through a sieve, and stand aside to cool.

The number of tints which are most useful for house ceilings is somewhat limited. Pink tints, unless purposely pure and delicate to match a chamber paper, are best made from Venetian red; burnt sienna for salmon tints. These two types are very useful for dining-room ceilings, harmonizing with most tones of broken blues, blue greens and olive greens. The purer the wall color, the softer our contrasting ceiling tint must be; and the plaster cornice should either contain various tints of the ceiling and wall properly balanced, or else should be finished all ivory white. If a wall color be bright in yellow tones, the ceiling must be brightened up to it, chrome yellow or chrome and raw sienna being used with white. Green tints, or gray tints, or blue tints for room ceilings are seldom desirable, unless relieved with ornament or simple paneling. With rooms having wall papers in these cool colors, the raw sienna tint of ivory white is the best in every sense.

Cornices against patterned ceiling and wall are best in a plain ivory tint, unless the room be consistently decorated. A plain tinted ceiling calls for a cornice in harmonious tones. With such, aim to keep your cornice color contrasts about the same degree of depth and color purity. Don't put light and dark colors together, since they tend to cut up a cornice into lines.—Architect, Builder and Decorator.



THE FIRST PRESBYTERIAN CHURCH, STAMFORD, CONN.—See page 3.



A SUMMER RESIDENCE IN MAINE.—See page 3.

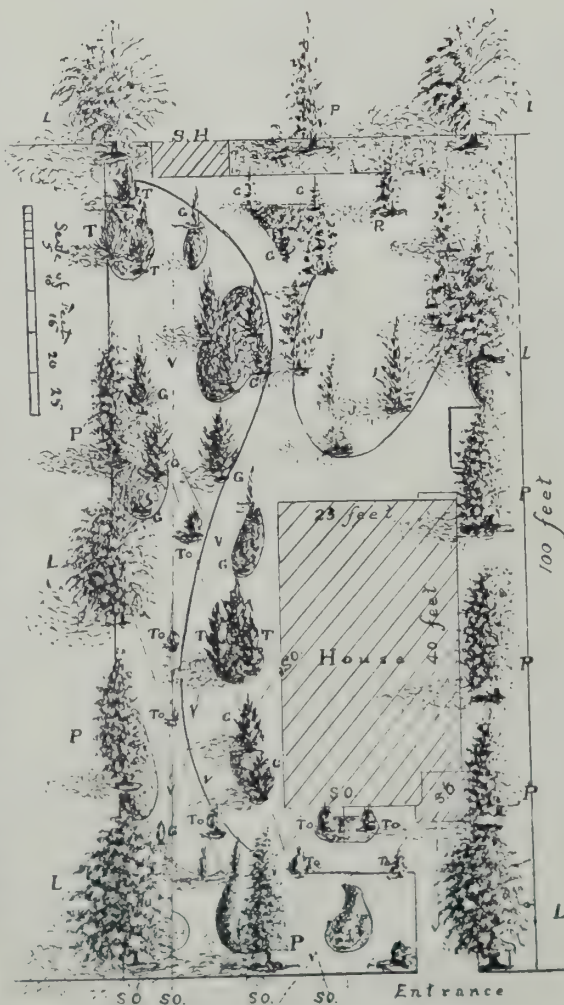
HOME GROUND ARRANGEMENT.

The plants we recommend are not intended to limit the reader to those named, but to demonstrate that results are attained only by following character. We have selected the Western Arbor Vitæ for the shrub effects, and do not allow anything to interfere with its prerogatives in its views, but in adding more variety to the garden we select suitable forms for the development of its particular character. This genus of plants is suitable to the colder parts of America; the genera of Biota can be used in the Southern States.

The shade trees for our plot are *Tilia Europæa*, the linden or lime, trees that give dense shade; when in flower they fill the air with delicate perfume, and they should be in more general cultivation.

Pinus larico, the Corsican pine, is well known by its erect habit, which makes it particularly suitable for small places. The oval space behind the house shows three silver Irish junipers (*Juniperus communis Hibernica*). Back of this oval is planted *Salisburia adiantifolia*, the maiden hair tree or Ginkgo, one of the remarkable trees of Japan, a plant combining quick growth with a curious light effect.

The five beds in front of the house are for summer flowers; the nine oval groups shown on plan are to be planted with suitable herbaceous plants according to the owner's requirements. In addition to the shrubs already named, the three figures on the left hand boundary should have a dozen hollyhocks distributed, four in a bed; then generally over all the groups, herbaceous plants, phloxes, double rockets (*Hesperia matronalis*), Pentstemon, not forgetting the sweet smelling common wall flower. The beds will then be ready for their final carpet, so that the whole will be completely planted and cover the intervals of soil between the plants we have named; for this we recommend *Ampelopsis Veitchii* (Japan ivy), which carpets the ground as well as walls when the opportunity is given it. The border in the rear of plot may be used for vegetables.



VILLA PLOT, 50 FEET WIDE AND 100 FEET DEEP.

The general arrangement of this plot is gravel around the house, and the beds set in the gravel will require permanent edgings. We recommend it made to show a stone work; this may be easily done by a bricklayer, who should lay a brick flat long ways around the figures, letting its top surface be two inches below the general level to act as a foundation for another brick set on its edge all the way around on the top of it. These require to be kept in the curve as perfectly as possible; then the bricklayer will take his concrete, made of cement and sand, and whirl the whole figure into perfect form. The three trees in the gravel on the right hand side of the house must have plenty of good soil provided for their roots, to be covered with a light coating of gravel, not over two inches deep, so as to carry out the plan.

The usually vacant ground along the side of the house can thus be turned into a perfect charm to both the house and road prospects.

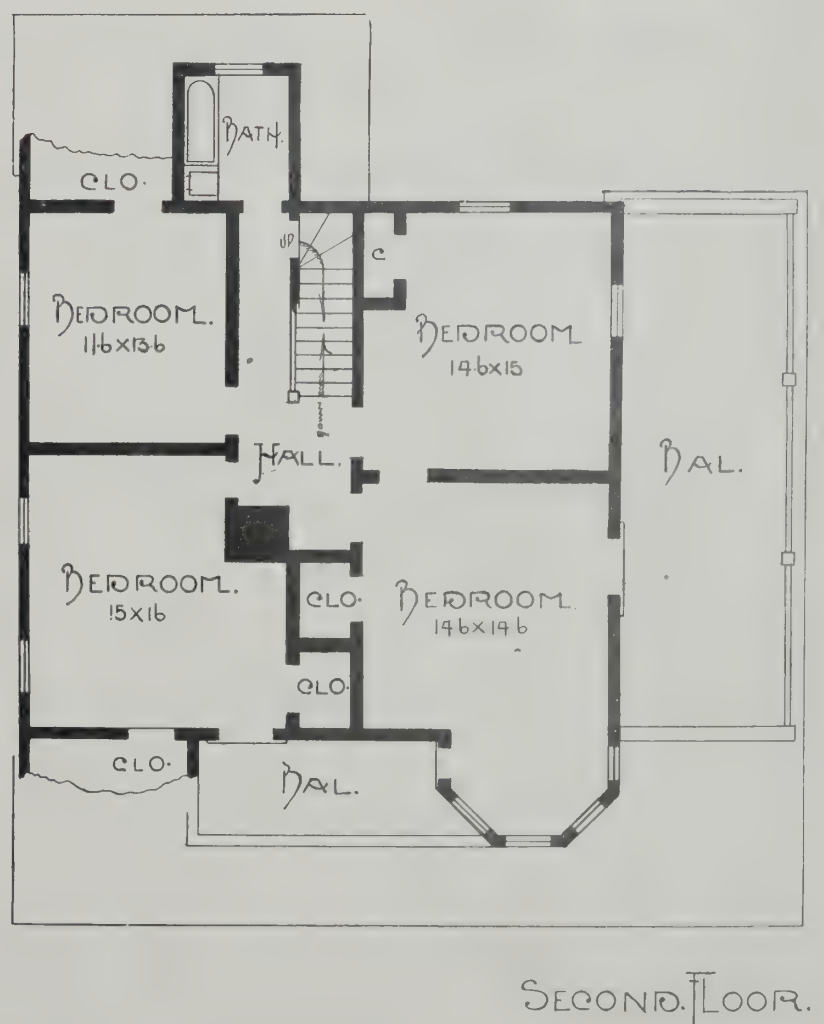
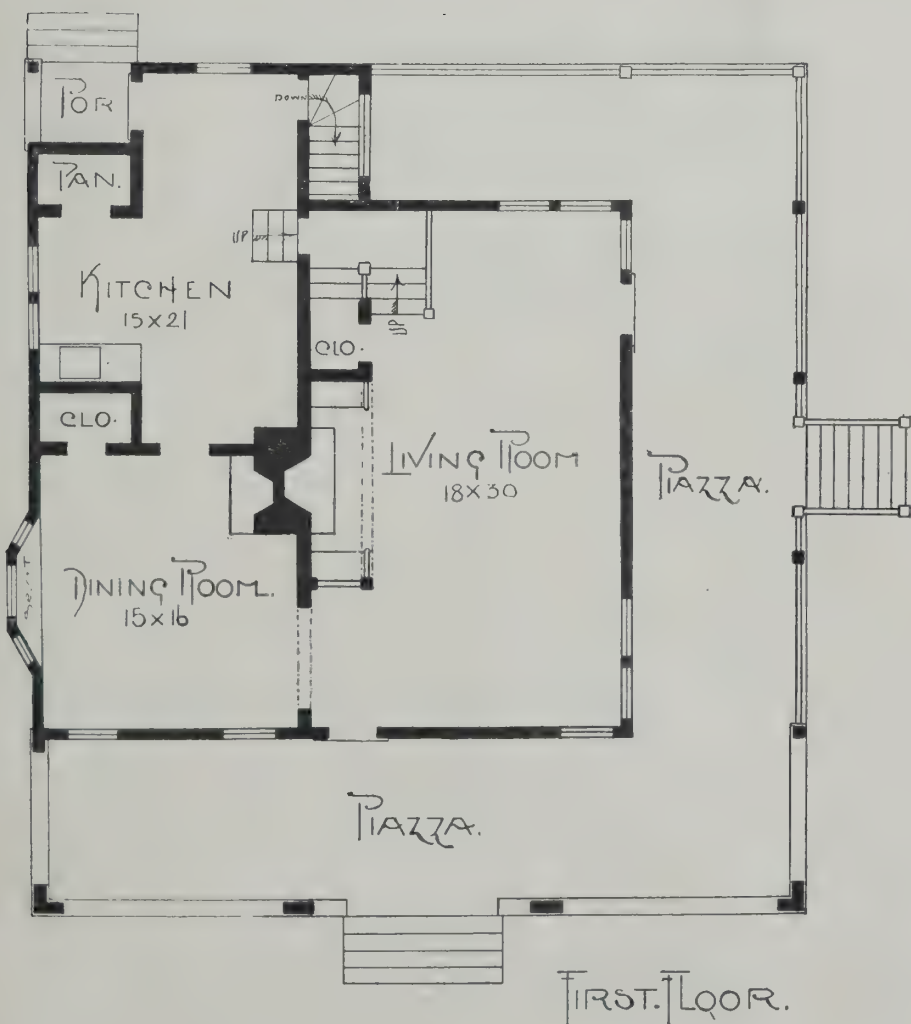
Our plan shows a perpetual garden residence on a plot of land 100x50 feet, and by adopting the natural arrangements you may imagine yourself taking fifty different views over it; you will never see two alike, and more than this, you will always find each one in harmony, in repose, in character, and possessing no objectionable features.

Narrow views are weak points; we show none, but instead direct the eye upon every occasion to the length of the ground by the formation of groups as shown on the plan. Harmony is retained by adopting the character of the Arbor Vitæ in mid-distance; repose is acquired by uniting the ground line, mid-distance and sky line together.

ABBREVIATIONS ON PLAN.

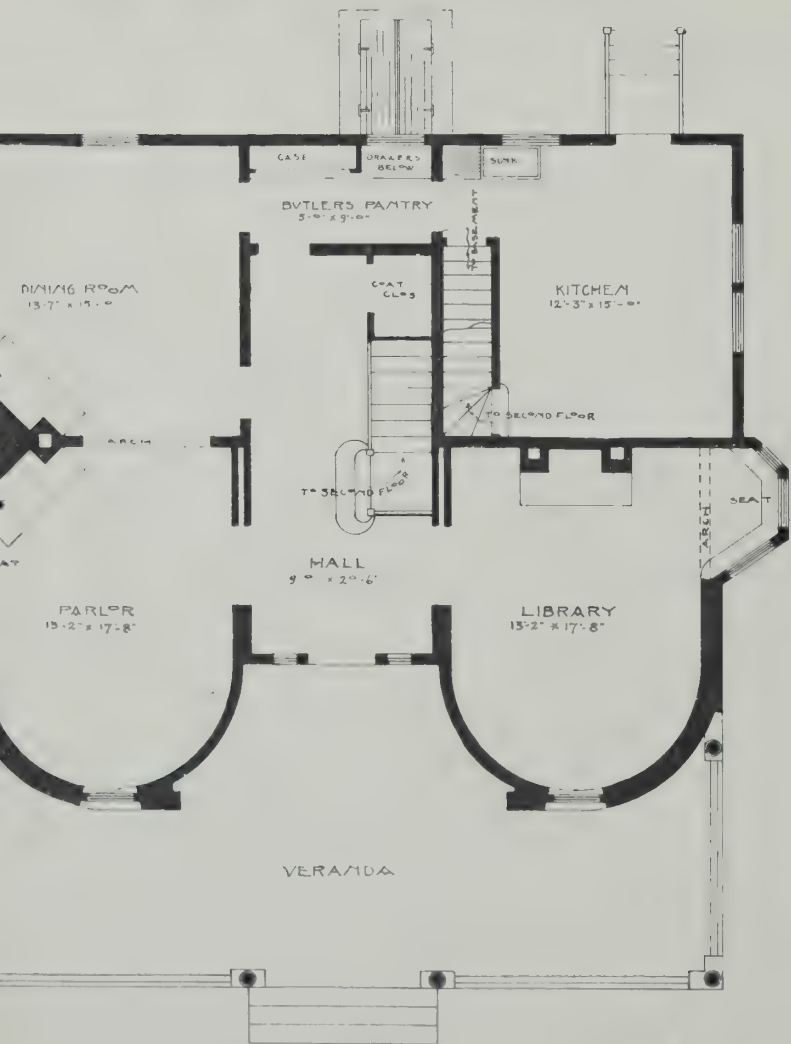
- | | |
|---|-------------------------------------|
| J— <i>Juniperus communis Hibernica</i> . | L— <i>Tilia Europæa</i> . |
| T— <i>Thuja occidentalis Var. vaneana</i> . | P— <i>Pinus larico</i> . |
| G— <i>Thuja occidentalis George Peabody</i> . | R— <i>Salisburia adiantifolia</i> . |
| 'T— <i>Thuja occidentalis Tomo Thumb</i> . | S H—Summer house. |
| | SO—Sites of observation. |
| | V—Lines of sight. |
| | H—House. |
| | E—Entrance. |

—American Gardening.

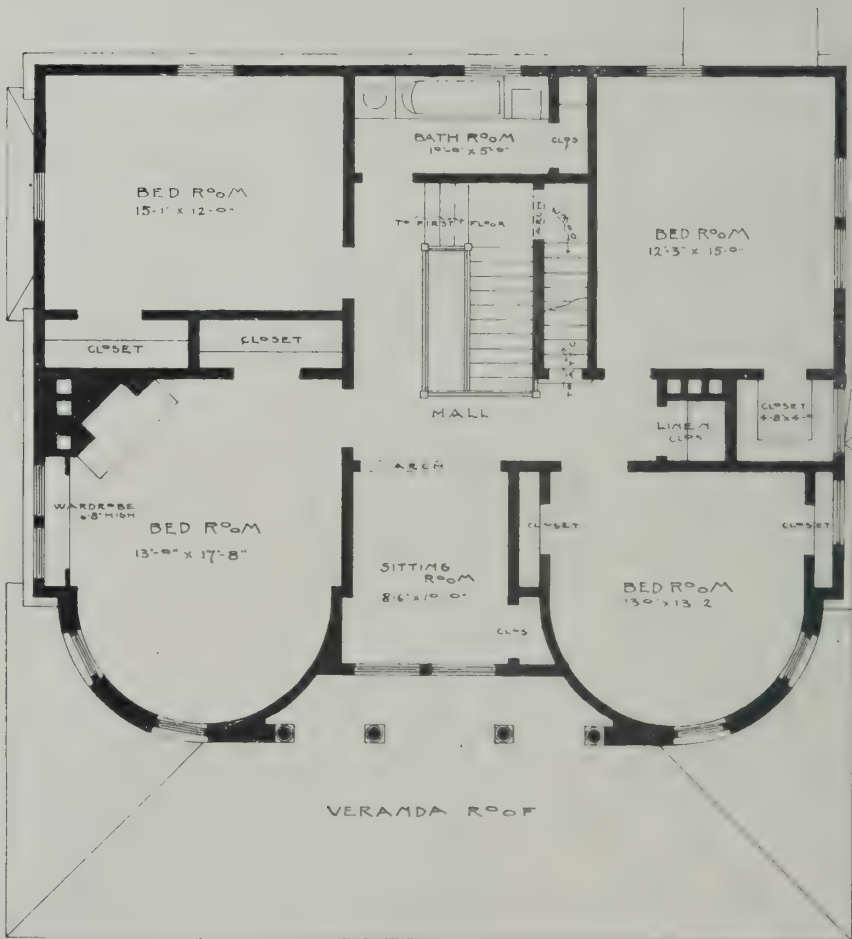


A SUMMER RESIDENCE IN MAINE.—See page 3.





FIRST FLOOR PLAN

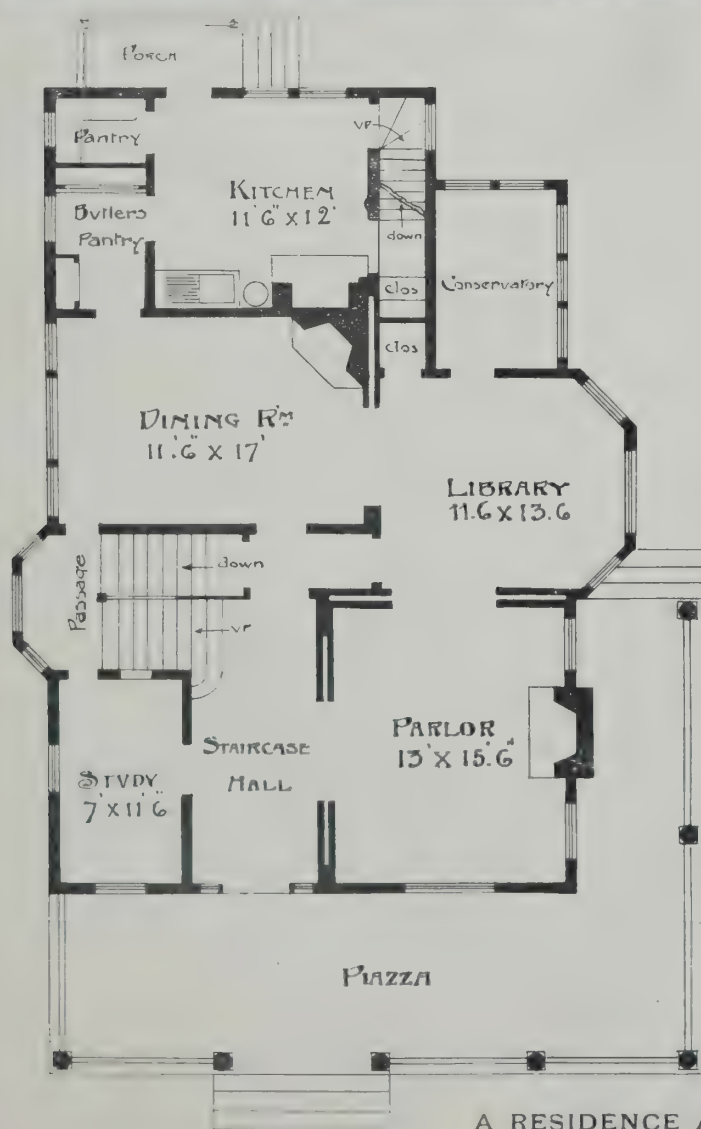


SECOND FLOOR PLAN

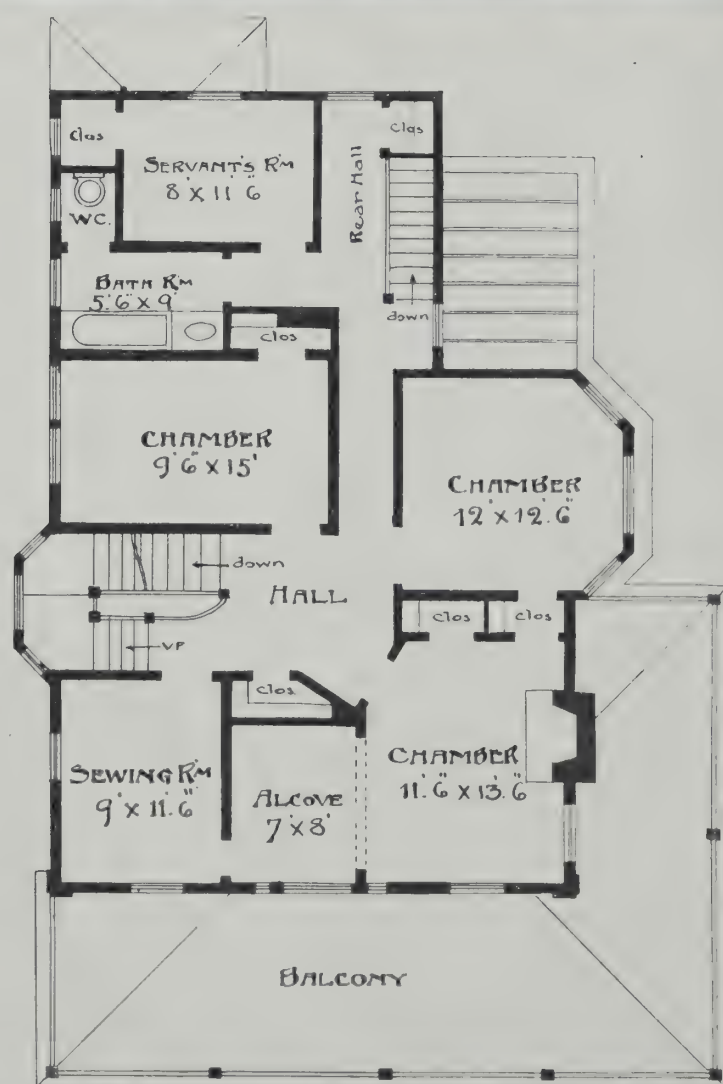
HOUSE AT SCRANTON PA.
E.G.W. DIETRICH ARCHITECT.
18 BROADWAY NEW YORK CITY

A RESIDENCE AT SCRANTON, PA.—See page 3.



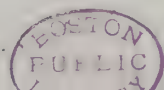


FIRST STORY PLAN



SECOND STORY PLAN

A RESIDENCE AT EAST ORANGE, N. J.—See page 2.



ARMORY OF THE SEVENTY-FIRST REGIMENT, NEW YORK CITY.

The people of New York take great pride in their military organizations. The National Guard of the State of New York has about 5,200 officers and enlisted men in

Upon a base carried on wheels, so as to be capable of movement when it is desired, is mounted a vertical hollow column. A carriage with guide rollers is arranged to move up and down this column, and this carriage sustains a horizontal carrier bar, which can slide freely back

The action of the mechanism is obvious. The stone to be operated on is placed in about the position required to work it by hand; the stone-dressing machine is moved to any convenient place near the stone (or the stone to the machine), the play of the counterpoise is adjusted for the height of the surface to be operated on, and the tool started. The hard granite at once succumbs, and in a very short space of time the surface begins to take shape, and in a few minutes a superficial foot can be dressed. The exhaust of the tool is caused to maintain a blast against the point of the tool to blow away the chips and dust.

In the foreground of the picture the machine is shown operating a cross chisel, while fine bushing is shown in progress in the background, the operator holding the tool in his hands so as to regulate its work.

Allowing for wages, repairs and fuel, it is estimated that the machine can be run for a cent a minute. From actual operation of the machine it is found that six to ten minutes is a fair average for work upon one superficial foot, and a saving of thirty cents per foot over hand labor on the basis of Quincy prices is found to be effected. On the work of a single machine this is a daily saving of \$18, an annual saving of over \$5,000. Owing to the more uniform cutting of the machine, from ten to twenty cents a foot additional is saved in the polishing, and the blacksmithing also costs less. As the machine produces no stuns, the quality of the cut work is very superior.

Another most important point is that it combines the skill of the workman with the efficiency of machinery. The stone need not be level, for by setting the tool properly and by ordinary attention on the part of the workman, it can be brought to a perfect surface.

Brick Dust Mortar.

The use of brick dust mortar as a substitute for hydraulic cement, where the latter cannot be obtained, is now recommended, the Southern Architect says, on the best engineering authority, experiments made with mixtures of brick dust and quicklime showing that blocks of one-half inch in thickness, after immersion in water for four months, bore without crushing, crumbling, or splitting, a pressure of



ARMORY OF THE SEVENTY-FIRST REGIMENT, NEW YORK CITY.

the city of New York. In the last few years the State has made liberal grants for building armories. One of the largest and finest of these is the new Armory of the Seventy-first Regiment, situated on Park Avenue, and occupying all of the western end of the block which is bounded by 33d and 34th Streets. It is one of the choicest locations in the city. We give herewith a photographic illustration of the general perspective view.

The edifice is built of light stone, the style a modified French Gothic. The crenellated towers afford an excellent position for marksmen in case the Armory should be attacked. The first floor is occupied by the great drill room, the library, and officers' rooms. On the second floor are the company rooms, which are appropriately decorated. The interior of the Armory and its appointments are admirably adapted for their intended use. The armory has just been finished. The architect was J. R. Thomas, of New York, and the contractor Patrick Gallagher.

STONE DRESSING BY COMPRESSED AIR.

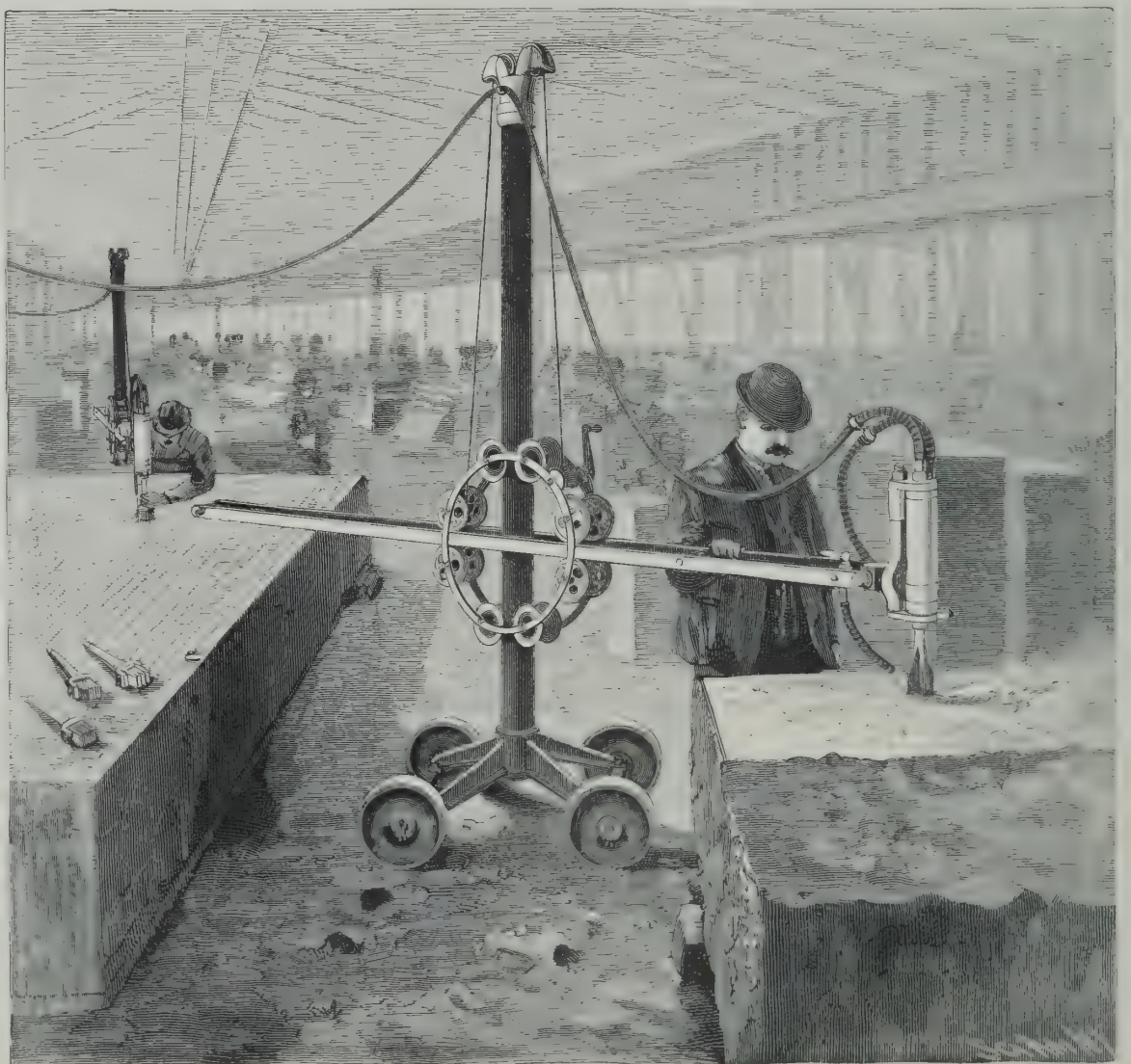
The tool proper is virtually a little engine worked by compressed air. Within a cylinder is a piston, which by the action of the compressed air is made to reciprocate back and forth with very great rapidity. On the up stroke it cushions against air, but on the down stroke it strikes against the head of a cutting bit, chisel or other appliance introduced into a socket in the lower end, and pressed upward by a spring. The chisel or other tool carried by it will receive several thousand blows in the course of a minute.

The distinctive peculiarity of the mechanism is that the cutting tool proper is not moved, but can be held constantly against the work while subject to the impacts of the reciprocating piston. On account of this distinctive action the pneumatic tool can be held in the hand against a surface, and will operate thereon without any other abutment. It is startling to see great flakes of stone pared off by its action, and stubborn material yielding to it as readily as wood to the action of a hatchet. A two inch chisel will cut flakes half as large as the hand in brownstone. For delicate work it is unexcelled; marble can be carved by it, the material shaping itself under the action of the tool, almost as if the design were being modeled from clay.

In our present issue we illustrate one of the last improvements introduced by the American Pneumatic Tool Company, of 844 Washington Street, New York City, the new portable stone dressing machine. This machine is designed for use on the hardest granite for working it to a surface. It takes the stone rough pointed, about an inch above the final surface level. It quickly brings the granite to a readiness for a polish by the use of a cross chisel, and for 4, 6, 8, 10 and 12 cut surface, bush hammers corresponding to hand hammers are used.

and forth, to one of whose ends the pneumatic tool is fastened. A partial counterpoise for the weight of the carriage, carrier bar and tool moves up and down within the column, and is attached by wire ropes to the carriage, and for adjusting the play of the counter-

the Southern Architect says, on the best engineering authority, experiments made with mixtures of brick dust and quicklime showing that blocks of one-half inch in thickness, after immersion in water for four months, bore without crushing, crumbling, or splitting, a pressure of



PORTABLE STONE DRESSING MACHINE OF THE AMERICAN PNEUMATIC TOOL COMPANY.

poise to provide for different elevations of the carrier bar, there is a windlass on the carriage. The carrier bar is double, and runs on four pairs of rollers, and, by sliding it in and out and swinging its end laterally, the tool can be moved in any desired direction in a horizontal plane

1,500 pounds per square inch. It is considered, too, that the addition of even as small a proportion as one-tenth as much brick dust as sand to ordinary mortars is preventive of the disintegration so often characterizing mortars used in the masonry of public works.

THE RELIANCE BUILDING, CHICAGO.

But little has as yet been published in Europe concerning the lofty office buildings which are so characteristic a feature of the larger American cities, and this has led our London contemporary, *Engineering*, to give the following: The Reliance building is situated on the southwest corner of Washington and State Streets, Chicago, the site measuring 55 ft. on State Street by 85 ft. on Washington Street. In 1890 plans were made for a 16 story building, and the foundations and first story of this new building were then put in, the upper four stories of the old building being held up on screws while the first story of the new building was slipped in under them. The original plans were somewhat revised this past spring, and the building changed to 14 stories, as shown on Fig. 1.

On May 1, 1894, the old building was taken down to the second floor, and the new building is being erected from the second floor up. The tenants of the first floor and basement—a drygoods firm—remain in their store and keep it open for business during the period of construction. Subsequently to putting in the first story, the owner of the ground and building, Mr. W. E. Hale, sold the ground to Otto Young for \$480,000, and leased it back immediately for 198 years at \$24,000 a year. Mr. Hale is putting up the new building, and Mr. J. H. Gray, C.E., of Chicago, is the engineer responsible for the ironwork.

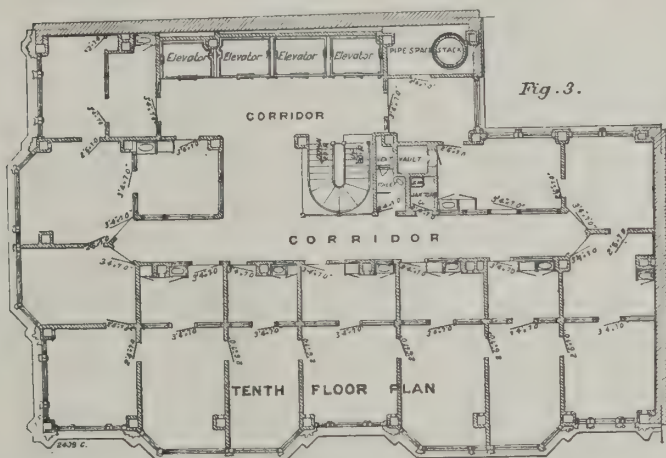
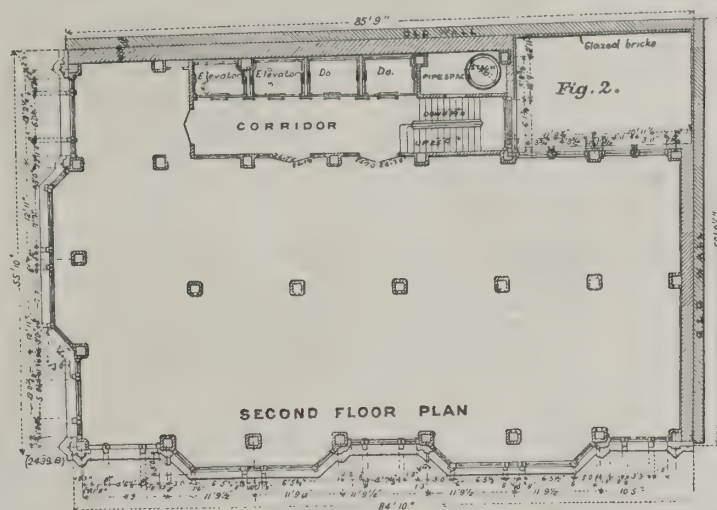
The building being very narrow compared with the height, viz., 55 ft. wide and 200 ft. high, especial attention has been given to designing the framework, which

The system of plumbing used in the Reliance building is the Durham. In this all the vertical risers, wastes, vents, and downspouts are of wrought iron pipe, coated inside and outside while hot with coal tar varnish. All pipes above 1½ in. in diameter are lap welded, and all are fitted together with screw joints. All pipes for carrying sewage in the ground under the building are of light cast iron, cast in 12 ft. lengths, coated inside and outside by the same process employed in coating water pipe, and put together with lead joints. The depth of the basement brings its floor much below the level of the sewer in the street, and also necessitates sub-drainage under the basement floor, which is ordinary agricultural tile surrounded by broken stone, inclosed in a light box frame of wood to keep it in position and alignment. This subsoil water, together with the waste from the fixtures in the basement, water closets and lavatories, and also from all lavatories throughout the building, with the exception of those in main toilet rooms on seventh floor and lavatories adjoining the pipe space, flows to a pair of Shone ejectors of fifty gallons capacity each, placed below the basement floor, and thence it is pumped into the sewer in the street. The wastes from all toilet rooms, together with the lavatories adjoining the pipe space, are taken down in a separate stack and connected direct with the street sewer, as is likewise done with the pipe taking away the roof water. All fittings for the pipes carrying wastes are of cast iron, threaded and properly coated. When used on a pipe laid to a grade, this grade is cast on.

front of the ruins of the city is one-half a mile in width, and gives evidence of having been cultivated at some remote period. A man's skeleton, 4 feet 8 inches in length, was also discovered. An exploring party is being fitted out to make a thorough investigation of the ruins.

REMOVING THE FRONT WALL OF A WAREHOUSE.

In connection with the widening of Minster Street, Reading, England, it was necessary to throw a portion of the site of No. 15 into the street. The operation is described in *The Engineer*, London, as follows: Mr. Arthur E. Collins, Assoc. M. I. C. E., designed and carried out an arrangement by which the existing front has been pushed back to the desired position. Every necessary precaution was taken to avoid accident, and these precautions proved effectual. The operations were as follows: The plate-glass shop front and the window sashes were removed; the floors and roof were shored up and



THE RELIANCE BUILDING, CHICAGO.

is of steel, and which carries the outer walls of the building. For wind bracing, instead of tension rods, which had been used heretofore, it was determined to put plate girders 24 in. deep at each floor between the outside columns, thus binding the columns together and transferring the wind strain from story to story on the table leg principle. These plate girders are bolted to the face of the column, and form a perfectly rigid connection with the column. The columns are in two story lengths, and joining columns break joints at each floor. Every piece of iron in the construction, including all the roof beams, is thoroughly fireproofed with porous fireproofing. Each piece of fireproofing around the column is wired to the column with copper wire.

The exterior of the building is white enameled terra cotta and plate glass. The windows were made as large as the situation of the columns would allow, and the position of these was fixed by the fact that they had to correspond with the columns of the old building and so are not as well arranged as they might otherwise have been. The interior of the building will be the most elaborately finished of any building in Chicago. The woodwork is of the finest mahogany; the floors are marble mosaic; the halls above the second floor are white Italian marbles, and in the first and second floors colored marbles.

The column also being open from top to bottom admits of putting the pipes in the corners of the column, and inclosing them with the fireproofing surrounding the latter. There is ample space for this. The connections of the plate girders to these columns are standard in nearly every instance.

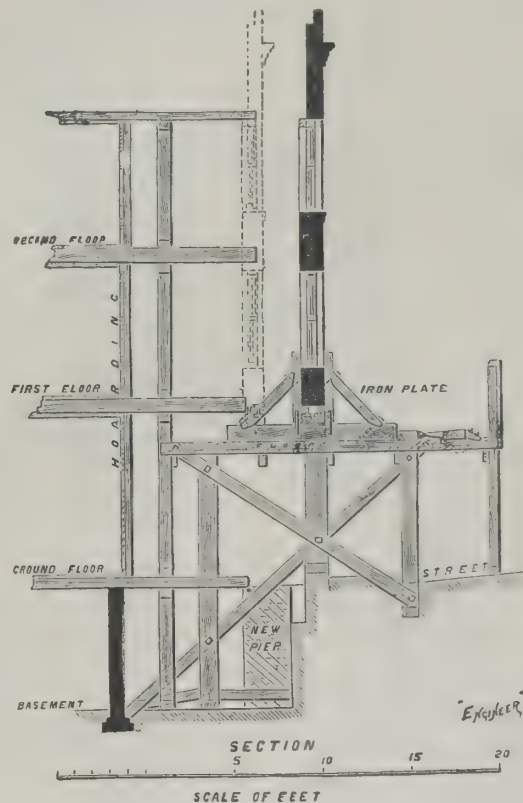
All changes in direction are made with curved and Y fittings. Hand holes or rodding holes are provided in abundance, and in the toilet rooms all fixtures are set away from the wall about 18 in., to allow working room behind them in case of stoppages, thus obviating the necessity of taking down marble partitions or backs, and tearing up the floor.

As the pressure maintained in the city water mains will not raise water much above the second floor, it becomes necessary to pump the water for the remaining floors.

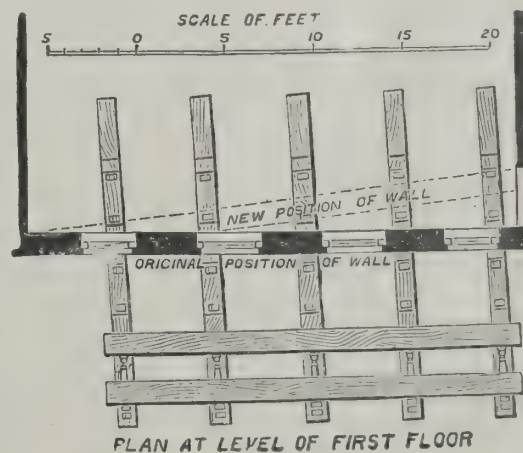
In the basement of this building are to be placed two high pressure boilers, of 100 horse power each, which will furnish steam for all the necessary pumping and steam heating. The building is to be heated throughout by direct radiation, supplied on the low pressure overhead system.

Interesting Ruins of Cliff Dwellers.

The ruins of a very interesting city of cliff dwellers have recently been discovered among the Bradshaw Mountains of Arizona. It is situated high up on the terraced banks of Willow Canyon, and is estimated to comprise 260 buildings, in a fair state of preservation. Like most of the cities of these strange people it stands in an almost inaccessible position. A series of narrow steps cut in the rock in the side of the canyon probably provided means of ascent and descent. Only a few of the buildings have been explored, and these were found to contain large quantities of pottery. The most interesting discovery, however, was a number of crude agricultural instruments. This is the first proof of any value that the cliff dwellers cultivated the soil. The canyon in



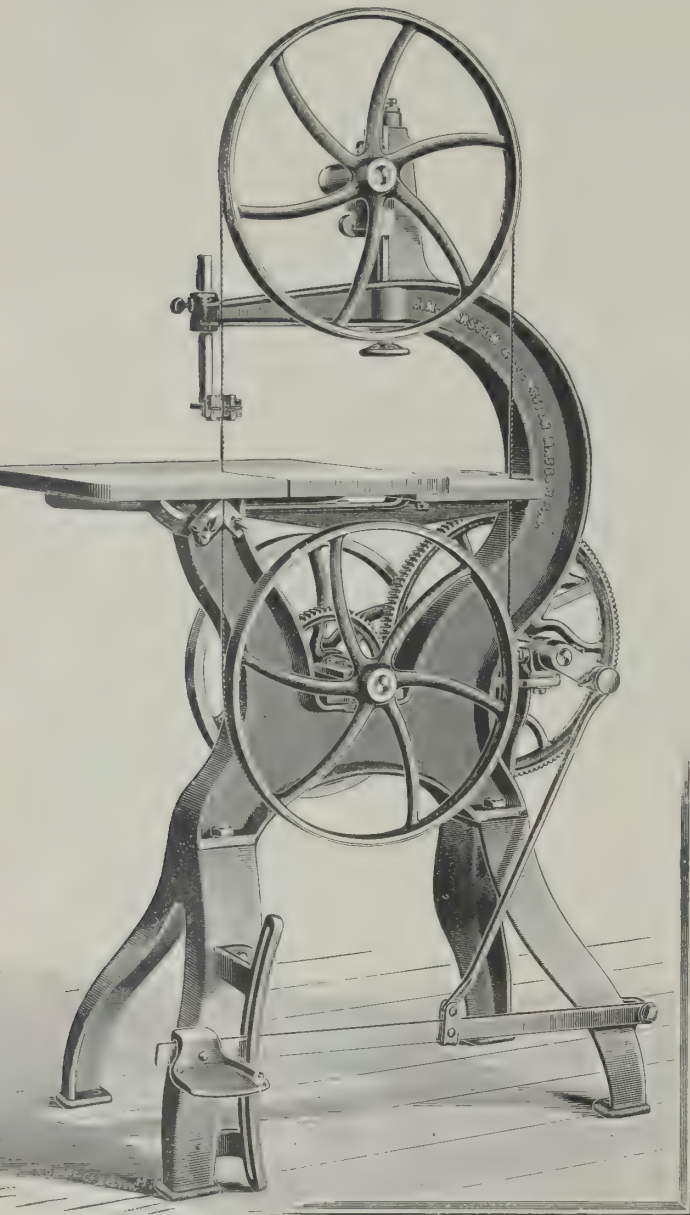
cut back to the extent of the intended setting-back of the front wall; five strong trestles were constructed beneath and across the girder supporting the front wall, and sliding pieces were placed on these trestles. The sliding surfaces having been well lubricated with soft soap and tallow, the weight of the wall was transferred to the sliding pieces by driving oak wedges between those pieces and the girder supporting the wall. The front wall was then cut away from the surrounding walls and from its supporting brickwork and columns. Screw-jacks were then applied to the slides, and the wall was pushed back into its new position. To prevent the wall from falling forward into the street, should it show a tendency to do so, four sets of Tangye's differential chain blocks were attached to the wall and to suitable points in the building, these chains being kept just taut. To prevent any falling inwards of the wall, struts, consisting of stout scaffold



poles, were butted on suitable parts of the building. These struts were constantly shortened as the wall moved back, so that whilst never touching the wall at no time was there a greater distance than one inch between the moving wall and the end of the strut. The actual moving was performed in about two hours and a half. The premises are about three stories high, and have a basement. The wall moved was 30 ft. long, 23 ft. high above first floor, and 18 in. thick, including plastering, etc. The front is stuccoed. The east end of the front was moved back 3 ft. 6 in., but the west end was not moved, as it was already fair with the adjoining building. The weight of the wall is about 38 tons.

IMPROVED WOODWORKING MACHINE.

The 20-inch saw shown in the illustration is built from an entirely new design, and is sufficiently strong and rigid to be adapted to all kinds of work ordinarily done on a power band saw, while affording the best possible service to those not having power. It occupies a floor space of 27 x 44 inches, its net weight is 350 pounds, and



MARSTON'S HAND AND FOOT POWER BAND SAW.

the height to top of saw pulley is 5 ft. 8 in. The frame is cast in one piece, to which the legs are bolted, and the bearings are all of steel, lined with Babbitt metal. The table is 22 x 22 inches, is 3 ft. 4 in. from the floor, and is made of kiln-dried wood. This machine is manufactured by Messrs. J. M. Marston & Co., 226-230 Ruggles Street, Boston, Mass.

"HEAT INSULATION AND FIRE PROTECTION IN PROMINENT BUILDINGS" is the title of a pamphlet just issued by the H. W. Johns Manufacturing Company, of New York, but it in no way discourses upon the asbestos pipe and boiler coverings made by the company, other than to point to the buildings in which these goods have been used. And the showing is a good one. Twenty pages of beautiful halftones, showing a hundred or more of the best modern structures in the large cities, electric light and cable power stations, factories, etc., in which these coverings have been used, would seem to be better testimony as to their merit than could be adduced in any other form.

It is stated in the *Moniteur Industriel* that the dark oak employed in decorative woodwork is prepared by submitting the wood for a certain length of time to the action of ammoniacal vapors, the latter rapidly imparting the dark tint which is in so much request. The operation consists simply in arranging the material that is to be rendered of a dark color in a tight room, into which no light penetrates. For the treatment of small pieces, a large box, whose joints are closed with strips of paper glued to the places whence the vapor might escape, suffices for the purpose, while for larger pieces a hermetically closed room is essential. Into the box, or room, are put several flat vessels containing liquid ammonia, they being placed upon the floor, so that the vapor may fill the space and give the tannin of the oak a very dark-brown color, which will not be altered if a little of the wood be removed from the surface. The liquid is not allowed to touch the wood, and the depth and richness of the color will depend upon the quality of the ammonia that is employed and the length of time of the exposure to its fumes.

Buff Brick in New York.

Builders and dealers in building material believe that the buff brick is to be a permanent and increasing conspicuous feature of New York architecture. Several considerable buildings of that material are now going up. The North Jersey fire clays, from which the buff brick is made, are seemingly inexhaustible, and the material can be brought to New York very cheaply. Some of the clays that lie near those used for these bricks are too valuable for ordinary building purposes, and are sent all over the country to be worked up for other uses. The crude clay is worth in some instances \$100 a ton. If the buff brick can be reduced in price, its use will be greatly extended, because houses and office buildings of that material rent more easily than equally well situated buildings of other materials. Luckily for house owners, the mere cost of front brick, whether red or buff, is not an important item in the construction of a considerable building, so that even a slight reduction, in the price of buff brick would probably greatly extend the use of that material.—N. Y. Sun.

Ceiling Paper.

The value of ceiling paper is worth a passing note. In this respect, I would point out the folly (from an artistic standpoint) of ceilings and walls being papered *en suite*—all to match in design and color. Now, a ceiling has no more connection with a wall than with the woodwork. The object of a wall paper is either to provide a serviceable background of color, or else to furnish a cheap and ready means of decorating a wall. Plain surfaces are always necessary to relieve and display ornamental ones, and a room having a decided pattern spread all over it can never be a pleasant, reposeful apartment. We may use a ceiling paper which has little or no design, for its color value as a tint, when walls have a decided ornamentation; when walls are free from design, or almost so, then the ceiling papers can be a decoration. At the same time, I am further of the opinion that one good ceiling design all over is far more tasteful and artistic than any elaborate paneling of paper designs and borders.

Some of the best American designs I have used on ceilings were sold for side walls—a hint to those readers who are handling wall paper as well as paint. The most acceptable ceiling papers are odd *motifs* or set designs in single prints of either gray, pink, buff, etc., upon white or slightly tinted grounds. As a rule, the best have no contrasting color introduced, the aim being to contrast a mass ceiling color with a mass wall ditto.—Frederick Parsons, in Western Painter.

DEC-CO-RE-O.

The illustration represents one of many new and beautiful designs just presented to the public by Messrs. Hall & Garrison, of 1140 Washington Avenue, Philadelphia, the work being done in an entirely new material, the constituents of which and the methods of manufacture form the subjects of recently issued patents. The material is of a tough, fibrous nature, very durable, and unaffected by moisture or change of temperature. It costs only a quarter as much as, and is adapted to take the place of, carving in all modern art work in buildings, such as grilles, transoms, window heads, stair balusters, being readily finished in every size and design called for in the decorative arts. Although its manufacture and adaptation to their uses have been perfected only within a few months, it has already been employed in the interior finishing of many costly New York residences, as well as in scores of more modest dwellings, its low cost making it very widely available. Plates, circulars, and illustrated catalogue descriptive of this new product may be obtained by applying to the manufacturers.



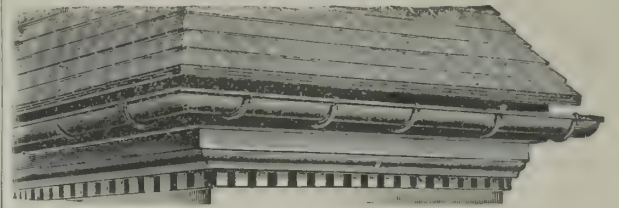
Depth, 16 ins.; length, 28 ins.

DEC-CO-RE-O—A NEW PRODUCT TO SUPERSEDE CARVED WORK.

Same Style in any Size.

IMPROVED GUTTER HANGERS.

Messrs. Berger Bros., of Philadelphia, besides their very complete line of tinner's hardware and specialties, make a prominent feature of the improved gutter hanger shown in the accompanying illustration. In these departments they give employment to upward of a hundred moulders. The firm have just secured the five-story building, 231 Arch Street, in their city, which they will

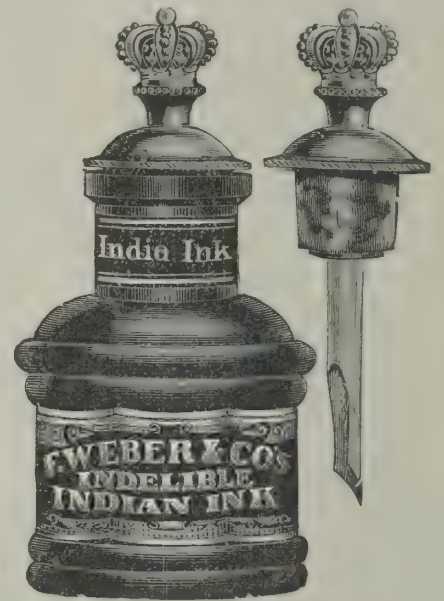


BERGER BROS.' GUTTER HANGERS.

use especially for the roofing supply department. They are stocking it with gutter pipe, sheet iron, corrugated iron and siding, and the other bulky goods characteristic of their line. The arrangement of the building is first class, and the facilities afforded for receiving and shipping goods are admirable, and conduce not a little to the attainment of a lead in bottom prices.

DRAUGHTSMEN'S SUPPLIES.

Messrs. F. Weber & Co., of 1125 Chestnut Street, Philadelphia, have long had a widely extended reputation for their "Crown" India ink, and liquid waterproof drawing inks, as well as for their technical moist water colors, which are furnished in pots and pans. The firm are manufacturers and importers of engineers' and draughts-



WEBER'S LIQUID DRAWING INK.

men's supplies and artists' materials of all kinds, and are also selling agents for the celebrated S. & H. Waterproof India Ink.

THERE is a curious conservatism in the brick trade that helps, perhaps, to maintain the ascendancy of the red brick. This conservatism is shown in the nomenclature of the trade, and especially in the survival of the shilling in the accounts of the brickmaker, the canal boatmen that carry brick, and perhaps even the consignee in this city. The builder, however, rejects the shilling and substitutes the dollar.—N. Y. Sun.

We are informed that Messrs. E. C. Stearns & Co., hardware manufacturers, of Syracuse, N. Y., have purchased the patents, tools, etc., of the Vanderbilt sash balance, and will hereafter manufacture them. They have become convinced, after selling it for a year or more, that it is an article of great merit.

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A RESIDENCE AT EAST ORANGE, N. J.—See page 20.

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This is a special Edition of THE SCIENTIFIC AMERICAN, issued monthly. Each number contains about 32 large quarto pages, forming, practically, a large and splendid Magazine of Architecture, richly adorned with elegant plates in colors and with fine engravings; illustrating the most interesting examples of modern Architectural Construction and allied subjects.

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AN ARTIST'S HOME.

The subject of illustration in colors on our front cover page is the residence of M. Rouzée, Esq., at Bronxwood Park, N. Y. The design shows an all shingled house of broad treatment, the high gambrel roof giving room for studio on top floor. Dimensions: Front, 35 ft.; side, 36 ft. Heights: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in. There is a well shaded porch, broad entrance hall, parlor with square bay at corner, lighted by large windows; this room has angle fireplace, as has also the dining-room, which connects by 6 ft. 6 in. opening; sitting-room with open fireplace on opposite side of the hall; the extension is used for kitchen, and open kitchen for summer use. Second floor contains three chambers and bathroom with all desirable fixtures; all rooms have large closets. Attic is used for studio, and has ombra in gable end, with overhanging balcony. Underpinning is of local stone; exterior framework sheathed and covered with shingles, as is the roof, all harmoniously colored. Finish throughout is of white pine. Cellar is cemented and contains laundry, hot air furnace and fuel storage. Cost complete \$3,300. A. F. Leicht, Esq., architect, 62 Liberty Street, New York City.

Our engraving was made directly from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT EAST ORANGE, N. J.

The subject of illustration on pages 19 and 31 is the recently completed residence of Geo. R. Howe, Esq., Park Avenue, East Orange, N. J. Our views show a very pleasing exterior, with broad, well shaded veranda, having fluted columns, supporting roof above, bays and wide porte-cochère. Ridge pieces are of red terra cotta; chimneys of brick, capped with stone. Dimensions: Front, 53 ft. 6 in.; side, 46 ft. 3 in., including all projections except veranda. Heights: Cellar, 7 ft. 6 in.; first story, 10 ft. 6 in.; second, 9 ft. 6 in.; attic, 8 ft. Underpinning and first story of stone, 16 in. thick, joints in red mortar, and furred inside. Exterior framework above sheathed, papered, shingled and stained brown; trimming color, brown. Roof covered with slate. The plan shows a most convenient and well thought out arrangement of rooms, wide entrance doors, with leaded side lights; staircase; hall, with staircase, having newel of neat design, and turned balusters, all in oak; fireplace, and nook, with seat. Seven foot sliding doors connect with parlor, finished in white and gold. Library, trimmed in sycamore, having angle fireplace and corner bay effect, connects by single sliding door, as does the dining-room, trimmed in oak, having bay its full width, with wide, mullioned window, fireplace and china closet; connects with kitchen, complete with all the usual fixtures, and trimmed with pine, through butler's pantry, finished in cherry, with sink and dresser. The cold room has hollow walls for proper ventilation, and contains refrigerator, etc. Back stairs in servants' hall (in pine), also dumbwaiter from cellar to second floor, and a toilet room. Second floor plan shows four chambers, with generous closet room; sitting-room, with fireplace; sewing-room, with wide linen closet and dumbwaiter and bathroom (around which the walls are pugged with brick), with fixtures complete; separate water-closet. All smoke flues are lined, and fireplaces have ash drops. Attic has three large rooms, trunk, storeroom and storage closet. Cellar, cemented, contains heater, laundry, 11 ft. 9 in. x 17 ft. 8 in., with three tubs, drying, provision and fuel rooms. Jas. H. Lindsley, Esq., architect, 762 Broad Street, Newark, N. J.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT GLEN SUMMIT, PA.

The handsome summer cottage, "Ma-Ha-Jo," erected for H. H. Harvey, at Glen Summit, a beautiful mountain summer resort near Wilkesbarre, Pa., has some very novel features. It is illustrated on page 22. The cottage is located on the mountain side and has a magnificent view. The dimensions are 52 ft. front by 54 ft. deep, not including the front steps or porte-cochère in rear. Heights: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in.; second story, 8 ft. 6 in. The cellar wall and pins built of stone, laid in lime and sand; all exterior framework sheathed, papered and covered with cypress shingles, brush coated with linseed oil; roof covered with cypress shingles and painted Nile green. The gables above ventilator, a copper red; trimmings, with ridge and finials of roof, ivory white; sash painted black; blinds and outside doors, bottle green; clapboards on inside porch painted a light lead color; porch and balcony floors, dark slate color; ceilings of same, narrow, yellow pine, hard oil finish. The living room, dining room, hall, staircase and bathroom are finished with cypress; balance of interior finished with yellow pine, rubbed and hard oil finish. Floors, yellow pine, stained. The rooms throughout are lathed and plastered with adamant; tinted in delicate colors, and stippled. The rooms are all well lighted, airy and very conveniently arranged. The hall is nicely arranged. The front hall is divided from the back hall by panel and lattice work, with portières leading to back hall, living room and dining-room on either side, with

grillework over the openings. Ornamental glass in front hall, lavatory, head of stairs, landing and bathroom. The first floor contains living room, dining room, hall, with closet and lavatory underneath the stairs. Kitchen, butler's pantry, storeroom, laundry, with earthenware tubs, servant's water closet, and stairway to cellar. The second story contains seven large bedrooms, with closets, hall closet, and bathroom, with all the modern equipments. Pure, spring water is brought into the house with pipes, and the building is attached to a splendid sewer system in the mountain. The broad porch, ten feet wide, well shaded, extending in front and on side, is no small feature. The great novel feature, however, of this cottage is that it is built without any chimneys, and they light, heat and cook with gasoline gas, made on the premises by Tirrill's gas machine. The house and porches are piped and lighted with gas. The living room and dining-room are both heated with the Backus gas log heaters, while in the kitchen there is a Jewell gas range, with water-back connected to a boiler, furnishing all the hot water needed. This is probably the first successful effort ever attempted to eliminate the chimney from a dwelling, and to depend entirely upon gasoline gas to do all the lighting, heating and cooking. It is the perfection of living, and the real key to housekeeping made easy. The plans were drawn by Messrs. Neuer & Darcy, Architects, of Wilkesbarre, Pa.

Our engravings were made directly from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT FOREST PARK, SPRINGFIELD, MASS.

The engravings and floor plans presented on page 26 illustrate a residence recently completed for Louis F. Newman, Esq., at Forest Park, Springfield, Mass. The building is two and one-half stories, and the exterior is a combination of the Colonial style with French chateau features. It has many novel and picturesque effects. The underpinning is built of brick. The first story is clapboarded, and the second and third are shingled. The colors are Indian reds, darkened, with ivory white relief, and the brickwork is painted to harmonize with the building above. Dimensions: Front, 31 ft. 6 in.; side, 41 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 8 ft. 6 in.; third, 8 ft. Upon passing through the vestibule with carved oak doors, you enter the library, or living room, which is trimmed with mahogany. The ceiling is paneled with mahogany beams of the German Baronial period. In the bay window recess is the fireplace, built of Perth Amboy enameled green brick, with French-tiled hearth and mantelsheff. This recess or nook has paneled seats, and is separated by an archway, with effective grillework in mahogany, and over the arched door leading from the library to the drawing-room is a dental course of ornamentation in the same wood. The gas fixtures and dog-irons are of wrought iron and artistic in design. The oaken staircase, leading up to the second floor, is lighted by a stained-glass window. The parlor is treated in white and gold in a delicate manner. The walls are covered with lin crusta, of cream ivory tints. The dining-room is treated in rococo style with oakwood work, and the color scheme is green and gold. The wall ornamentation is in bold figures, while the ceiling is ornamented with emblazoned shields bearing the bee and lion of Napoleon. The floors throughout are laid with oak. The china closet is fitted up with shelves, drawers and cupboards. The kitchen is also conveniently located, and all the arrangements are adapted to produce the maximum of results with a minimum of labor. The second floor is treated in colors. The second floor contains four bedrooms, large closets and bathroom. The latter is finished in blue and white, English glazed tiling, and woodwork of mahogany. The fixtures are set in Tennessee marble, with brass furnishings. Servant's room and storage on third floor. Cemented cellar contains furnace, laundry and other apartments. Mr. Louis F. Newman, Architect, 23 Elm street, Springfield, Mass.

Our engravings were made direct from photographs of the building taken especially for the SCIENTIFIC AMERICAN.

PATENTS.

Messrs. Munn & Co., in connection with the publication of the Scientific American, continue to examine improvements and to act as Solicitors of Patents for Inventors. In this line of business they have had fifty years' experience, and now have unequalled facilities for the preparation of Patent Drawings, Specifications, and the prosecution of Applications for Patents in the United States, Canada, and Foreign Countries. Messrs. Munn & Co. also attend to the preparation of Caveats, Copyrights for Books, Labels, Reissues, Assignments, and Reports on Infringements of Patents. All business intrusted to them is done with special care and promptness, on very reasonable terms. A pamphlet sent free of charge, on application, containing full information about Patents and how to procure them; directions concerning Labels, Copyrights, Designs, Patents, Appeals, Reissues, Infringements, Assignments, Rejected Cases. Hints on the Sale of Patents, etc. We also send, free of charge, a synopsis of Foreign Patent Laws, showing the cost and method of securing patents in all the principal countries of the world.

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"SUNNYSIDE."

We publish on pages 24 and 25 "Sunnyside," the residence of Robert S. Walker, Esq., at Flatbush, Long Island, as the subject for one of our colored plates in this issue. The whole treatment of the design is executed by detail in a most exquisite manner. There are many interesting features, including piazza, bay windows thrown out at random, loggia, chimneys and tower. The underpinning is built of "rockfaced" red sandstone, laid up at random. The chimney, exposed to view, is laid up with brick in red mortar. The building, of frame above, is clapboarded on the first story, and painted olive brown, with olive yellow trimmings; second story and roof are shingled and stained a mottled effect. Dimensions: Front, 45 ft.; side, 78 ft., not including piazza. Height of ceilings: Cellar, 8 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. The plans present many large and well lighted rooms, and the convenience of the various apartments, and their respective privacy to each other, are apparent. The several rooms, communicating as they do, make a most attractive vista of the entire floor immediately upon entering. The main hall is in the Gothic style, and is finished in quartered oak. The ceiling is heavily beamed and ribbed, forming deep panels. The broad, low staircase, with posts extending to ceiling, and elegantly carved, is the principal feature in hall. Between these posts are carved brackets, forming a frame, which is filled in with ornamental spindlework. The walls are paneled with quartered oak up to a height of eight feet. Hall also contains two nooks, separated by archway and spindle

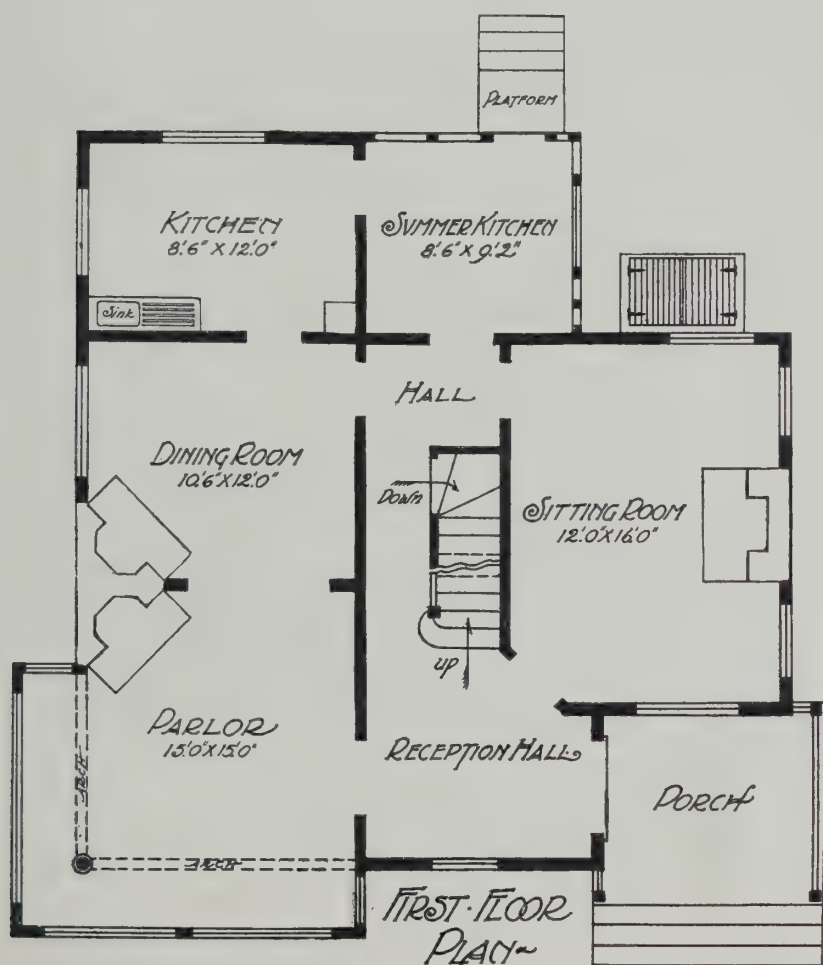
A DWELLING AT GERMANTOWN, PA.

The engraving and floor plans on page 29 illustrate a picturesque and well appointed residence, erected for the late E. E. Denniston, Esq., at School Lane, Germantown, Philadelphia. The design, while not distinctive in style, borders on the German, its gambrel roof, running full width, being well broken by dormers, gables, tower and bays. The broad entrance porch and arch are interesting features. Leaded glass has been effectively used, although some of the sash are divided by wooden muntons. Dimensions: Front, 65 ft. 7 in.; side, 43 ft. 10 in., including all projections except veranda. Heights: Cellar, 8 ft., first story, 10 ft.; second, 9 ft.; attic, 8 ft. Underpinning, and structure above, is of local gray micaceous stone; sills and all cut work of bluestone. Roof and all exterior framework shingled and left to weather. The first floor plan shows hall, full length, finished in oak, with bay and fireplace; double arch at staircase, of easy rise. Dining-room connects by sliding doors; is also trimmed in oak, and has broad arch, open fireplace, and china closets. Butler's pantry, in chestnut, has dresser, sink, and dumbwaiter to kitchen, which, owing to sudden fall in ground, has been placed in basement. Reception room, with angle, fireplace and alcove, finished in painted pine. Second floor is divided into three chambers, nursery and bathroom, all finished in pine, painted; hall trimmed in oak. Attic has four chambers, with closet and linen room, fitted with shelves and drawers, all in natural pine. Cellar, cemented, contains hot air furnace, fuel bins and lavatory, on a different level, with separate

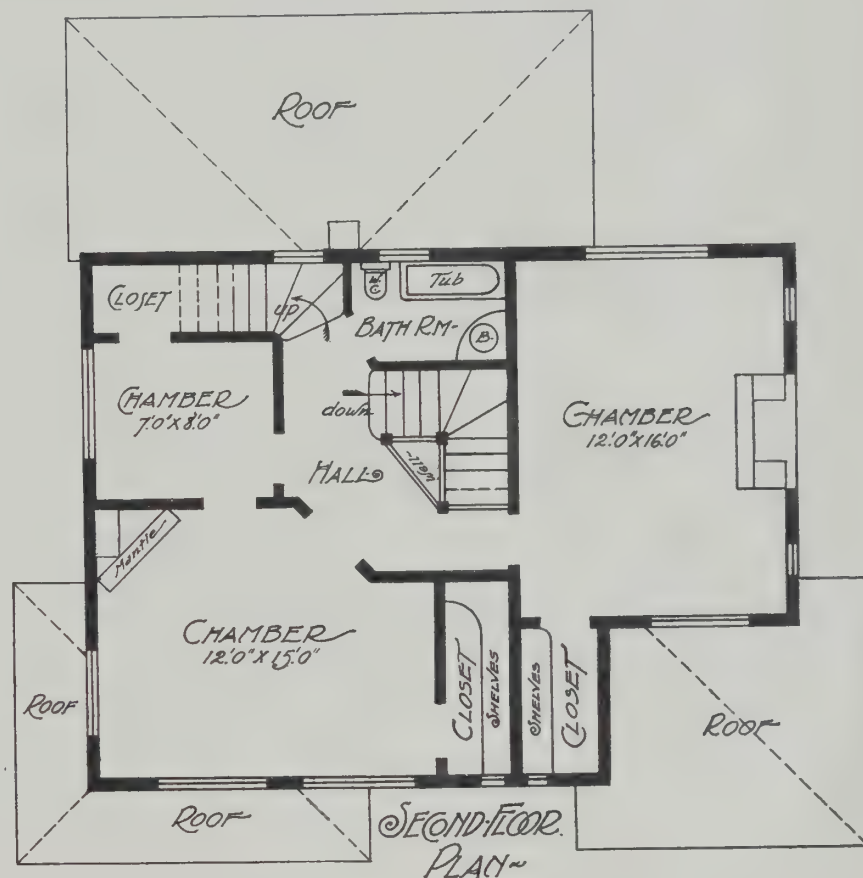
room, besides linen closet, dressing-room and closets to chambers. The stairs to attic are built over main stairs, this floor being reserved for servants' rooms and storage. The rooms are heated by hot air furnace in basement. The exterior is painted silver gray, with white trimmings. The architect and designer is Mr. E. R. Tilton, New York City, the entire cost being \$5,800.

A COTTAGE AT SOUTHAMPTON, L. I.

The illustrations on page 28 present the country house of Judge Kilbreth, at Southampton, L. I. The whole treatment of the design is in the Colonial style, with a broad, spacious, and well shaded piazza. The exterior walls throughout are covered with shingles and painted chrome yellow. Roof is shingled, and painted red. Dimensions: Front, 35 ft.; side, 50 ft., not including piazzas. Height of ceilings: Cellar, 8 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The interior throughout is trimmed with yellow pine, finished natural. Hall contains an ornamental staircase turned out of similar wood. Parlor is separated by an archway provided with spindle transom, and it contains a bay window, with a paneled divan. Dining-room has an octagonal projection. Each apartment has an open fireplace, built of brick, with hearth and facings of same, and mantel. The floors are laid with yellow pine in narrow widths. Kitchen, laundry, lobby, and pantries are wainscoted with narrow beaded stuff, and are furnished with the usual fixtures in the best possible manner. The second floor contains five bedrooms and bathroom; the latter is wainscoted and furnished



AN ARTIST'S HOME.—For Elevation in Colors, see front page of cover.



transoms, and provided with paneled seats. Vestibule has a tiled floor. Drawing-room is trimmed with mahogany. The casings are carved. The fireplace is built of brick with tiled facings, and hearth with nickelplated trimmings. The mantel is carved in a handsome manner, and provided with mirror. Library is trimmed with cherry. It has ceiling beams, and an open fireplace with tiled trimmings, and mantel with columns extending to ceiling. Billiard room is trimmed with ash. The walls are wainscoted to a height of four feet with narrow beaded stuff. The space above is covered with shingles, finished natural. The ceiling is ribbed, and the panels are ceiled with narrow beaded stuff. Hardwood floor. Dining-room is finished in quartered oak, and is a mixture of Gothic and Renaissance. It is wainscoted in panels, and the ceiling is ribbed with oak. The casings are carved. The fireplace is furnished with tiles and wrought iron trimmings. It has also a carved mantel, with mirror. The butler's closet is well fitted up with store-closet, dressers, cupboards, and bowl. Kitchen, laundry and pantries are wainscoted and trimmed with ash, and furnished with the best improved fixtures in the best possible manner. The second floor is trimmed with cherry. It contains seven bedrooms, twelve closets and bathroom. The latter is paneled in ash, and furnished with the most modern fixtures. Third floor is trimmed with sycamore, and it contains six bedrooms and ample storage. Cemented cellar contains furnace and other necessary apartments. Mr. Frank Freeman, architect, Vanderbilt Building, Nassau and Beekman streets, New York City, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

steps from floor above. The laundry and kitchen, with floors of yellow pine, are also here, for the reason previously mentioned, the former having three tubs, range and sink; the latter is complete, with usual fixtures, and has dumbwaiter in pantry, together with several dressers. Cost complete \$22,000. Geo. T. Pearson, Esq., architect, 427 Walnut Street, Philadelphia, Pa.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT NUTLEY, N. J.

This house, built at Nutley, New Jersey, shown on page 23, is framed, and covered with sheathing and shingled. The roofs are also shingled and project over front veranda, and is carried on small circular wooden columns grouped together, the gutter being supported by a row of brackets. The foundations are of rough rubble masonry, forming basement walls; numerous windows give light and ventilation; the floor is concreted and covered with flooring laid on sleepers. On the first floor is a large staircase hall in the centre, with parlor and dining-room on one side. The library and a children's room on the other, with a fireplace to each room. The kitchen is in the rear, and is separated from the hall and dining-room by a good-sized pantry. The rear stairs to second floor and down to basement are built in one corner and lighted on each story. A laundry adjoins on the rear, with the W. C. opening on back porch. The mantels, trim and floors are all hardwood. In the second story are a guest's room, three chambers and a nursery, with a large spare room and bathroom in rear. There is a store-

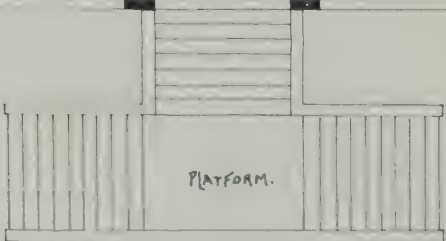
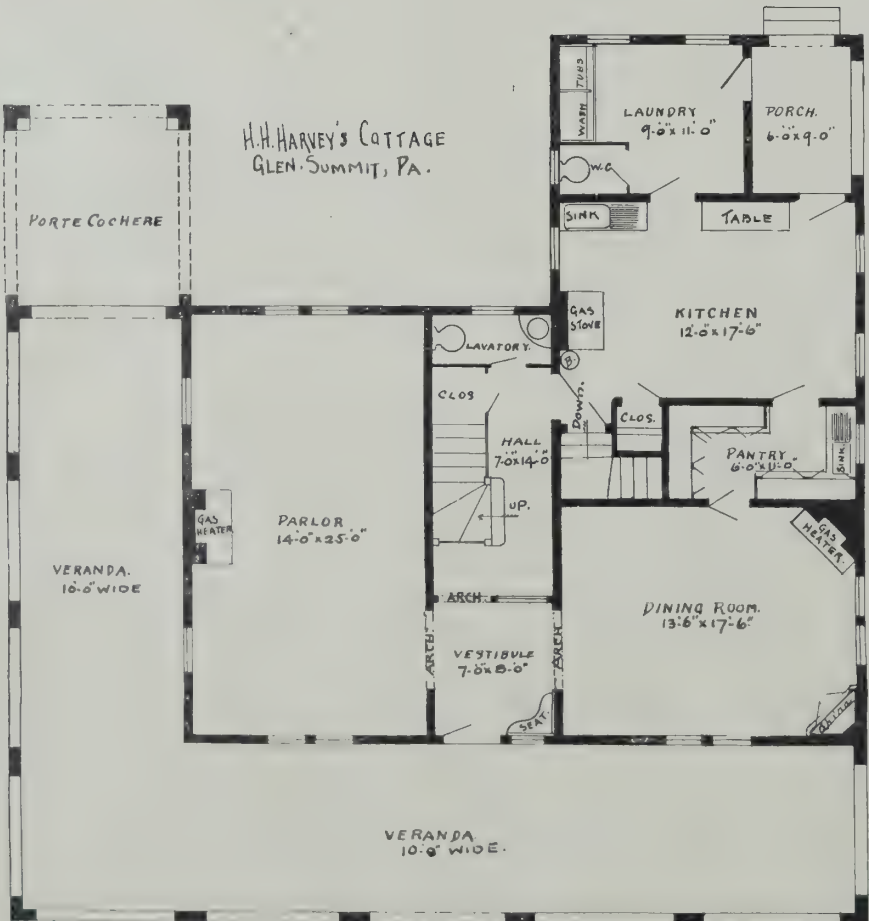
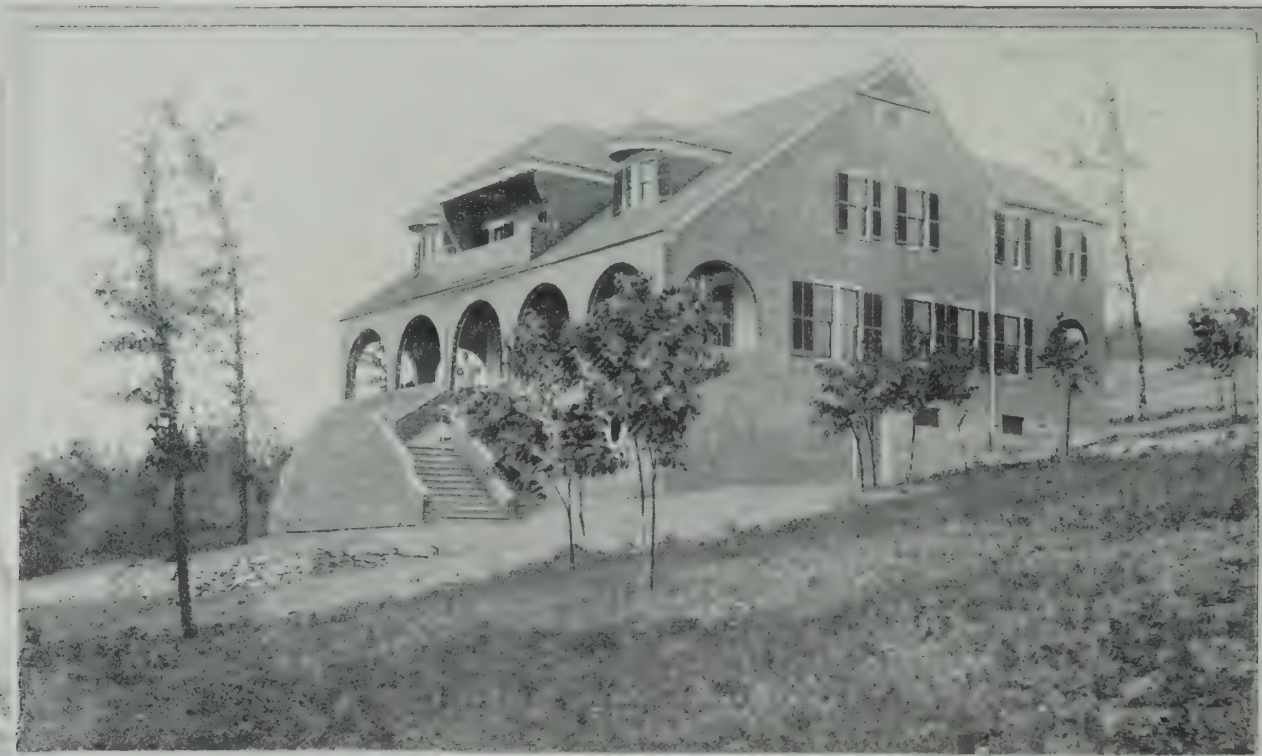
complete. Two bedrooms and storage on third floor. Cemented cellar contains furnace and other necessary apartments. Mr. C. H. Skidmore, architect.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

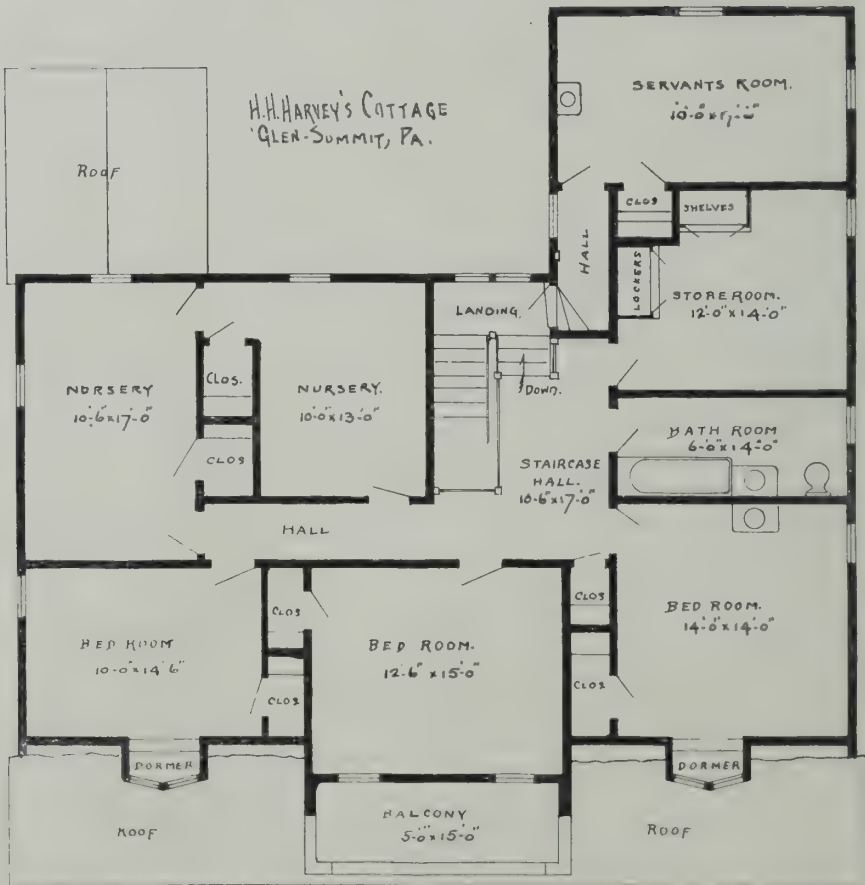
HALL AND LIBRARY, GLEN RIDGE, N. J.

Our illustration and floor plans on page 30 represent the hall and library at Glen Ridge, N. J. The design is broadly treated, having an octagonal corner feature, forming tower; entrance porch, with square wooden columns, supporting hipped roof above. There is also a side entrance, with porch, having similar roof, supported by columns of Gothic detail. Underpinning and superstructure of local stone, of very rich color, 18 in. in thickness. The high vousoirs of the flat arches are very effective. Roof of red slate, copper ridge pieces; trimming color, deep Indian red. Dimensions: Front, 30 ft.; side, 58 ft., including bay, but not porch projections. Heights: Cellar, 7 ft.; first story, 10 ft.; second, 15 ft. Reception room has wide fireplace, and connects with office; lavatory to left. Library of good size, with ample bookcase accommodation. Second floor shows a well lighted assembly room, with arch to tower room; seating capacity about 150 persons. Floors are all of hardwood. Trim throughout, whitewood, finished natural. Cellar, cemented, contains hot air heater, fuel bins, etc. Cost less than \$12,000. Wilbur S. Knowles, Esq., archt. No. 21 West 24th Street, New York City.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC



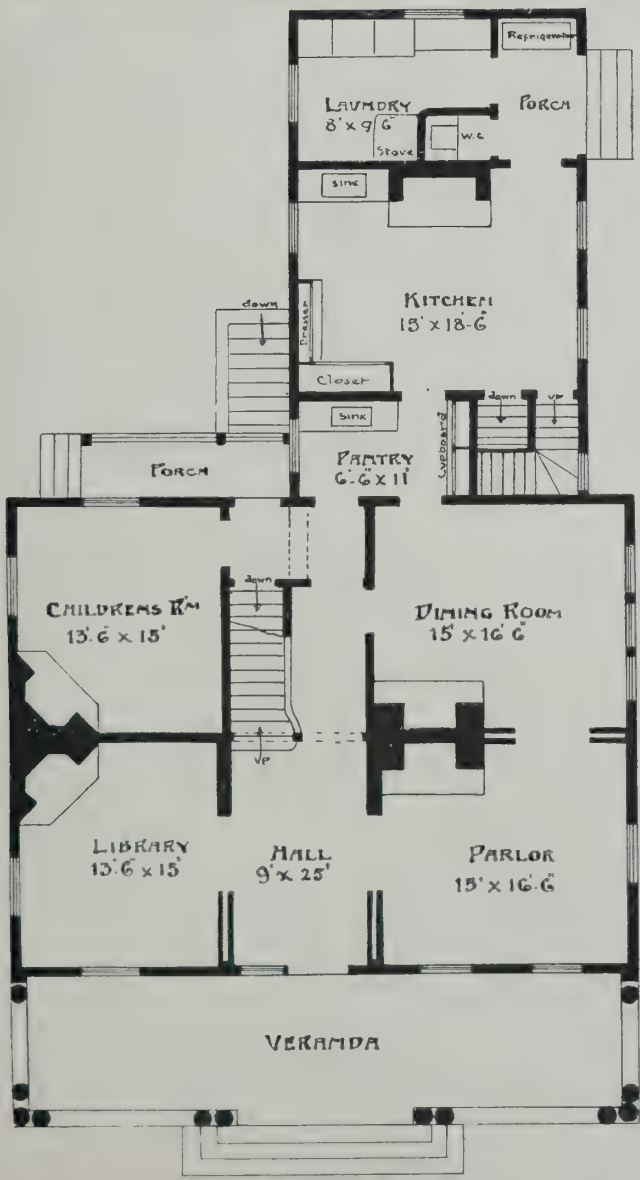
FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

A COTTAGE AT GLEN SUMMIT, PA.—See page 20.





FIRST FLOOR PLAN

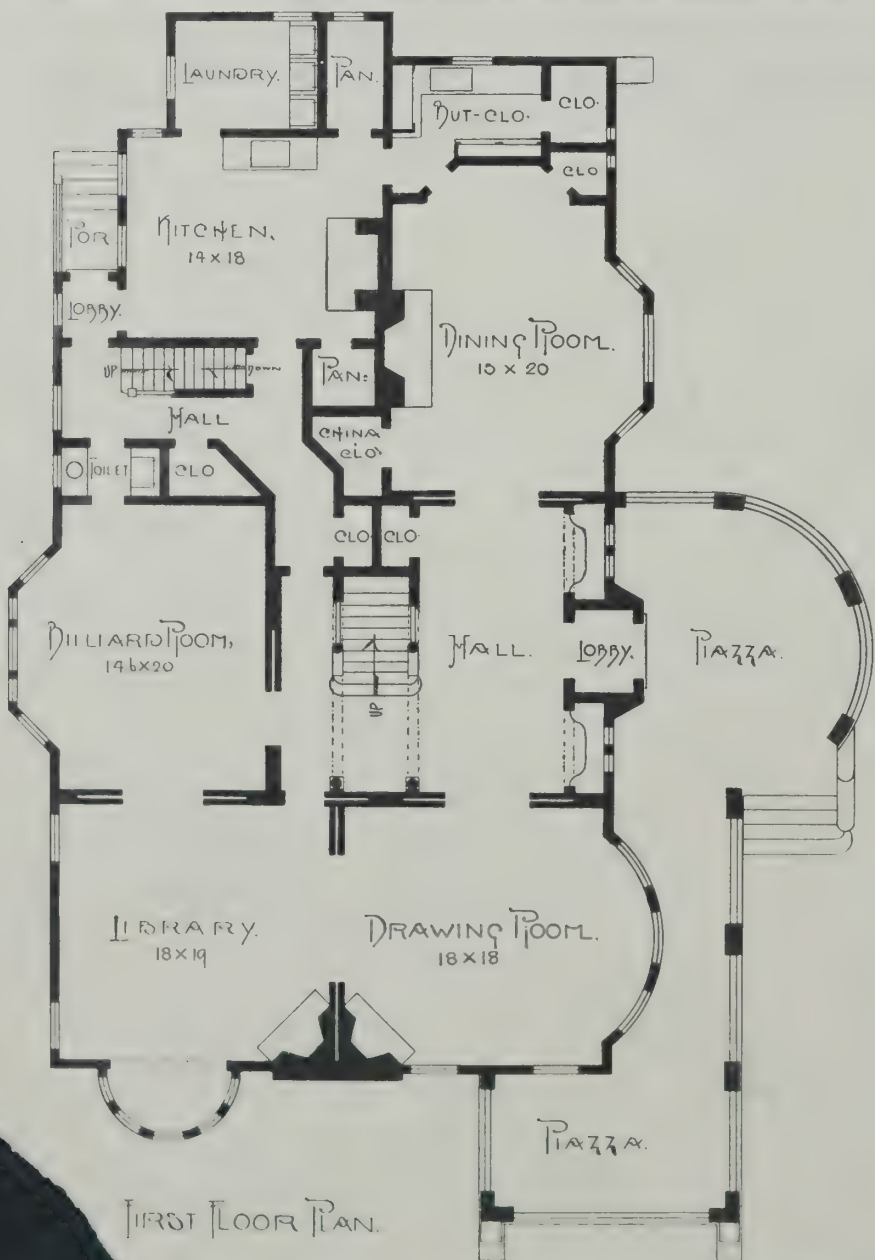


SECOND FLOOR PLAN

A DWELLING AT NUTLEY, N. J.

See page 21.





"SUNNYSIDE," A RESIDENCE AT FLATBUSH, L. I.—See page 21.





"SUNNYSIDE," A RESIDENCE AT FLATBUSH, L. I.—See page 21.

A DWELLING AT SOUTH ORANGE, N. J.

We illustrate on page 33 the residence of R. F. Stevens, Esq., on Stanley Avenue, South Orange, N. J. The view shows an interesting exterior in the Colonial style, having a broad, well-shaded veranda running around the entire house, except at hall and kitchen, with Tuscan columns supporting balcony above, having goose-necked rail and plain balusters. Two dormers relieve the lines of the gambrel roof and light the attic. Dimensions: Front, 32 ft.; side, 38 ft., exclusive of veranda projection. Heights: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; attic, 8 ft. Underpinning of hard burned brick; exterior framework above sheathed with hemlock; T. and G. boards placed horizontally, papered and covered with clapboards on first story, painted yellow; shingled above with cedar shingles, 7 in. to weather, and stained snuff brown; roof shingled, gray in color. Trimming color, white; lattice and blinds painted dark green; sash, olive. The plan shows a convenient arrangement of rooms. Reception hall has staircase of Georgia pine, high ornamental newel, turned balusters, and angle fireplace of buff brick, with mantel above. Library and parlor also have fireplaces, all forming into one chimney; the latter room connects with dining-room, having fireplace and dresser, by sliding doors. Butler's pantry, cut out of this room, contains copper sink and dresser, and is means of passage to kitchen (wainscoted 4 ft. high with $\frac{1}{2}$ in. N. C. pine), with usual fixtures of good make, boiler being of copper. Second floor is divided into four chambers, with ample closet accommodations and bathroom, wainscoted 4 ft. high with Georgia pine and neatly capped, containing copper tub and basin at angle of marble. Balcony at angle is an interesting feature. Attic has two large rooms with closets, large linen closet, and copper lined tank in storage space. Cellar, cemented, contains laundry, with 3 tubs and closet, servant's W. C., heater and fuel bin; floors throughout are double finished, being selected Georgia pine on first floor, N. C. in second and attic; finish throughout, whitewood, natural. House is

lighted by gas, and cost, complete, \$6,500. P. C. Van Nuys, Esq., architect, Prudential Building, Newark, N. J.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

ALTERATION OF BLINN HOMESTEAD, CAMBRIDGE, N. Y.

We present on page 32 two views, showing a most successful alteration, in the Colonial style, of the Blinn Homestead, at Cambridge, Washington County, N. Y. The first view shows the original structure, as built over 100 years ago. The plans are so drawn as to show the addition and changes which have been made. The original frame partitions are of hand hewn timber, filled in with unburnt brick, the nails and all hardware having been hand forged. Dimensions: Front, 44 ft.; side, 61 ft., exclusive of piazza and wood shed extension. Heights: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 8 ft. 6 in.; attic, 8 ft. The old house, as may be seen, had merely a plain gabled roof, shingled, sides being clapboarded, while the new views illustrate a picturesque arrangement of roof lines, well broken, and relieved by an octagonal tower, or observatory, giving a broad outlook over the surrounding mountains. The loggia and porte-cochère are built of moss-covered field stone, rustically laid; color, gray. Tuscan columns support the roof above. Wavy shingles, stained snuff, have been effectively introduced in the gables; all others left to weather. Sides left clapboarded, and painted cream white, which is also the trimming color. Tongue-and-grooved boards, with joints well puttied, have been used on exterior of tower, presenting a smooth surface, which is relieved by the fine detail of plaster wreaths and festoons. Underpinning of local stone, dry laid, and afterwards pointed. Chimneys of brick. The changes which have been made to the plan show a well thought out and convenient arrangement. Arches have been effectively introduced in the hall and chamber. The den, with its fireplace, and seats at side, is separated from hall by circular columns, with

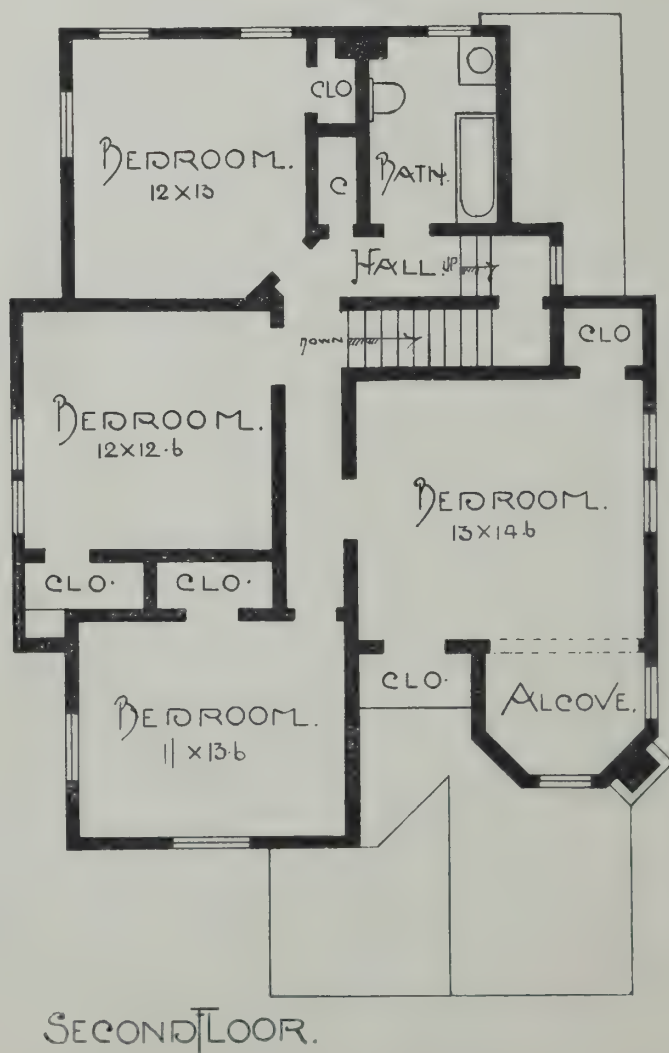
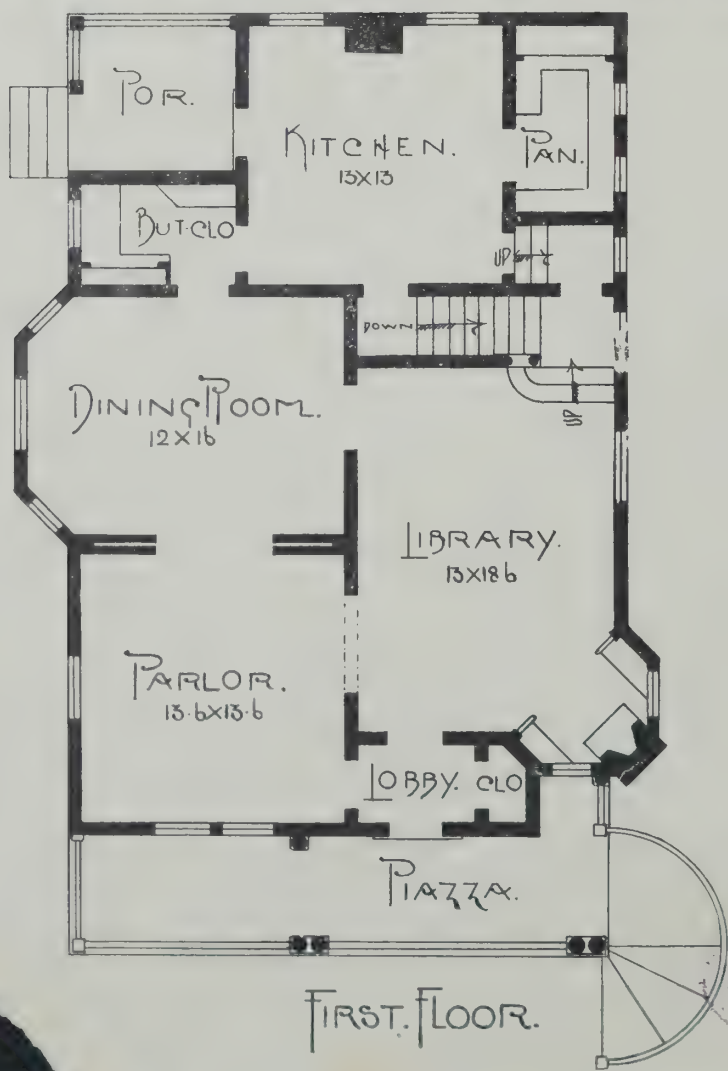
spindled arch. The bay in dining-room, with its mulioned window, and balcony above, is a happy effect. Second floor is divided into four chambers, study and bathroom. Attic has two rooms finished off. Any further information may be obtained of the architect, H. Inman Furlong, Esq., 83 Nassau Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT CUSHING'S ISLAND, ME.

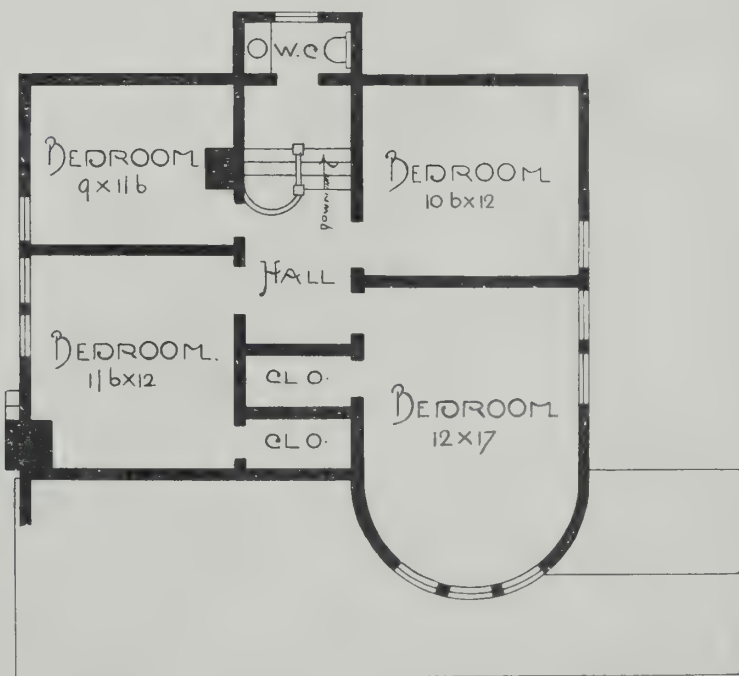
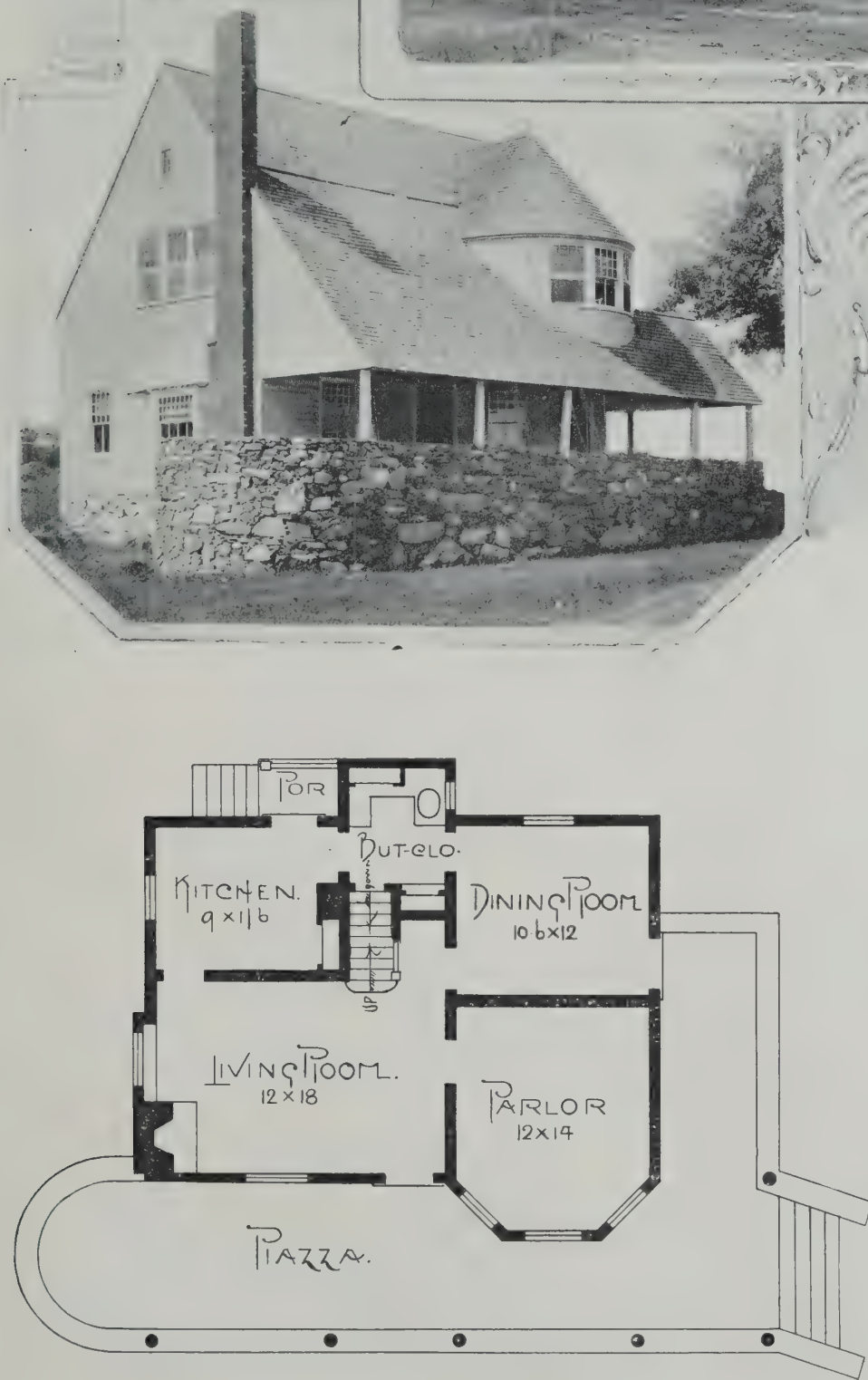
We publish on page 27, as a subject for one of our colored plates, a Colonial dwelling, which has been erected for Francis Cushing, Esq., at Cushing's Island, Me. The design is unique and picturesque, and an ideal model for a summer home, and for which it is intended. The underpinning and balustrade to piazza are built of field stone laid up at random. The exterior framework is sheathed, covered with shingles, and painted Colonial yellow. The roof is shingled and stained a moss green with mottled effect. Dimensions: Front, 32 ft. 6 in.; side, 29 ft. 6 in., not including piazza. Height of ceilings: Cellar, 6 ft.; first story, 9 ft.; second, 8 ft. The interior throughout is trimmed with spruce and finished natural. The walls and ceilings are ceiled up with narrow beaded stuff. There is no plastering on the interior. The living room contains an open fireplace built of brick, with facings and hearth of same, and a hardwood shelf. The staircase has turned newel balusters and rail. Parlor and dining-room are well lighted and ventilated. Kitchen and pantry are well fitted up and are complete. The second floor contains toilet, large closets and four bedrooms. The third floor or attic contains ample storage. The cellar is merely a rough cellar for storage, and it could be improved at a small expense. Cost, \$2,000 complete. Mr. John Calvin Stevens, architect, Oxford Building, Portland, Me.

Our engravings were made direct from photograph of the building, taken specially for the SCIENTIFIC

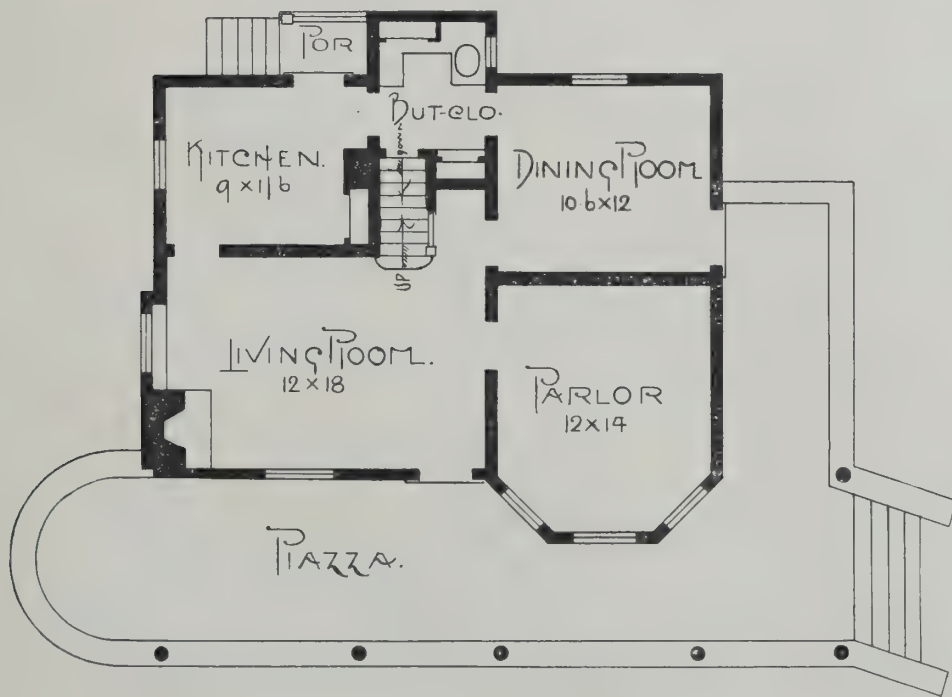


A RESIDENCE AT FOREST PARK, SPRINGFIELD, MASS.—See page 20.



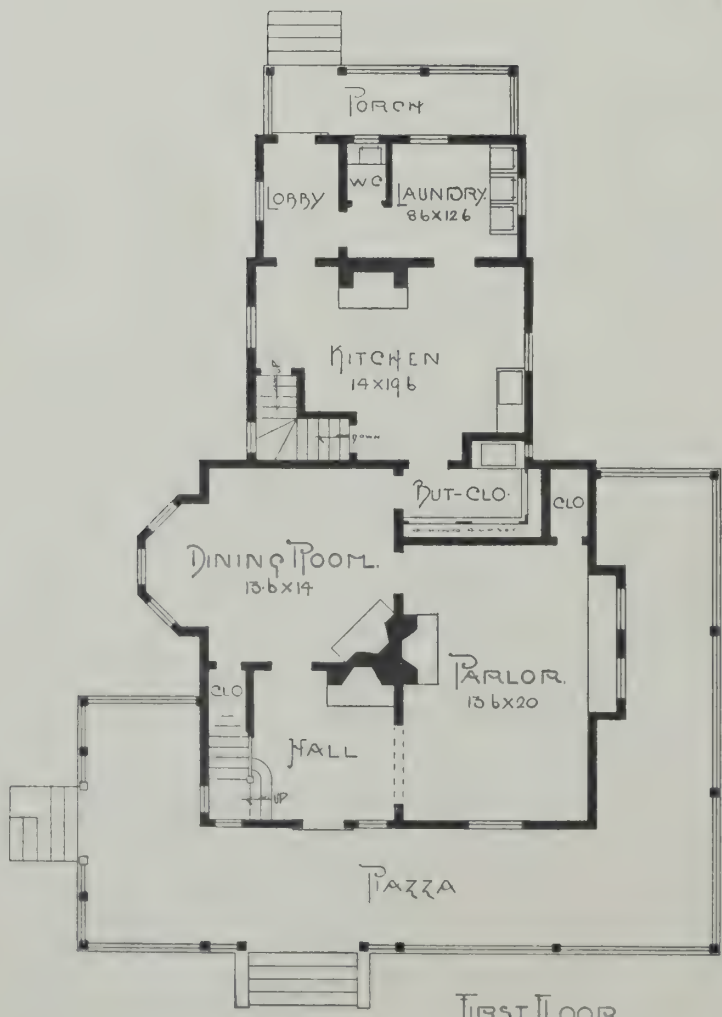


SECOND FLOOR.

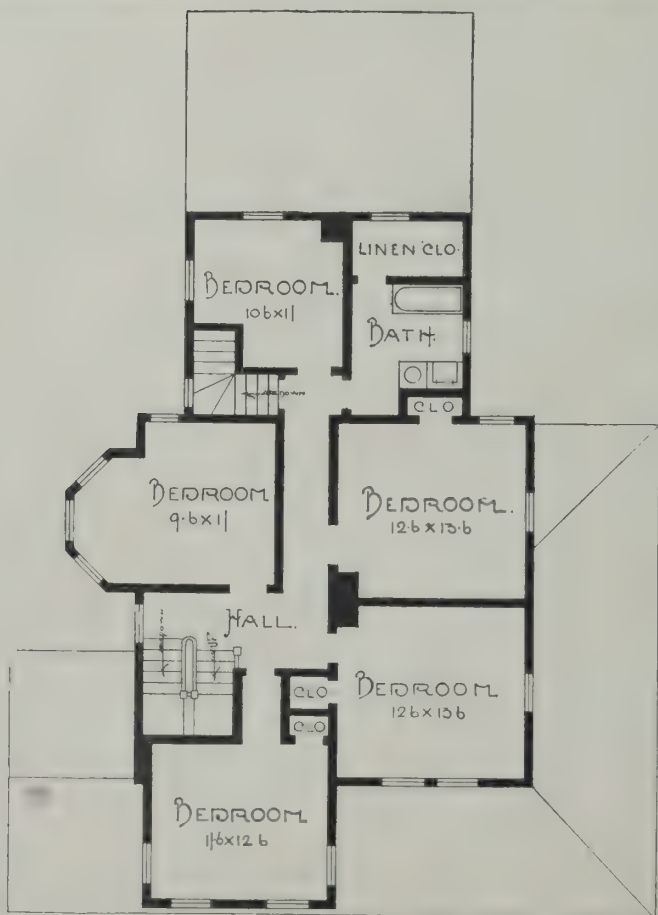


FIRST FLOOR.





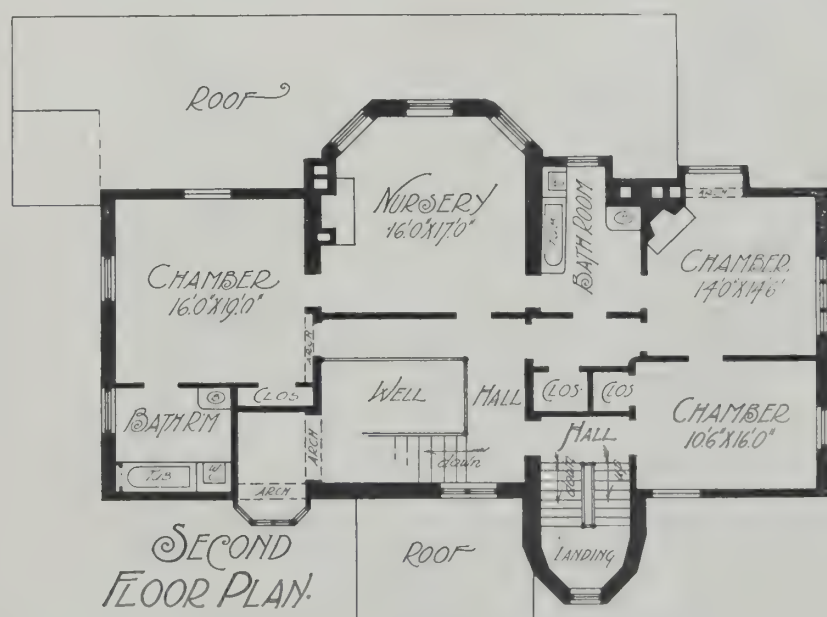
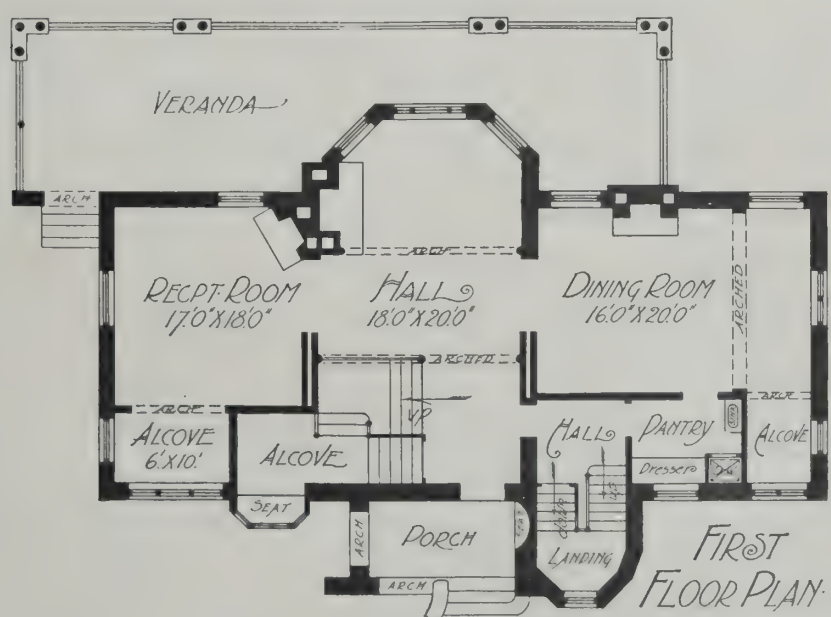
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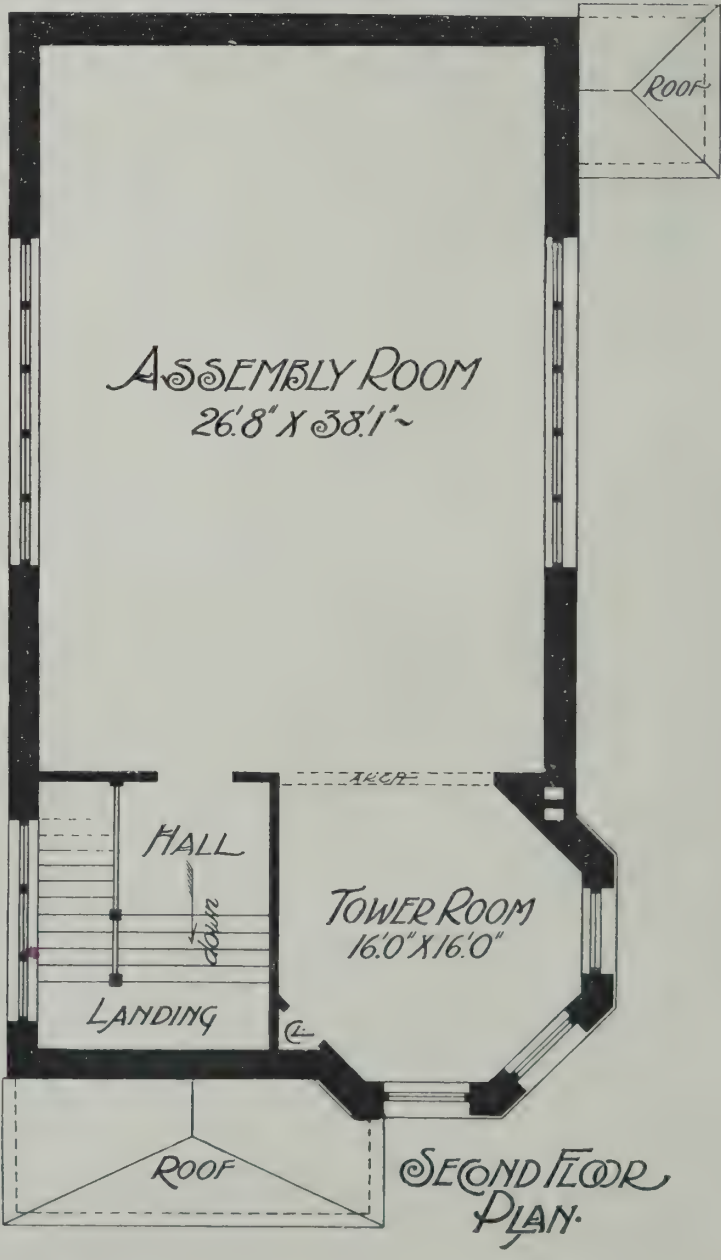
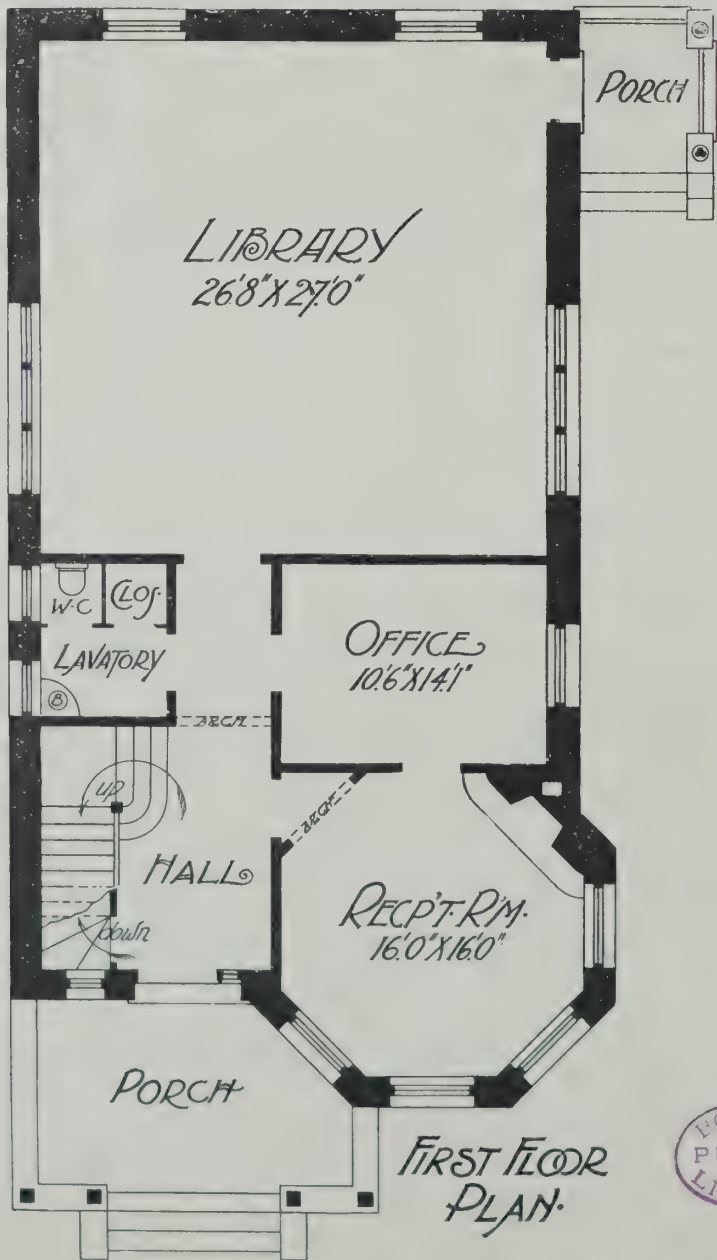
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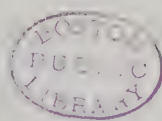
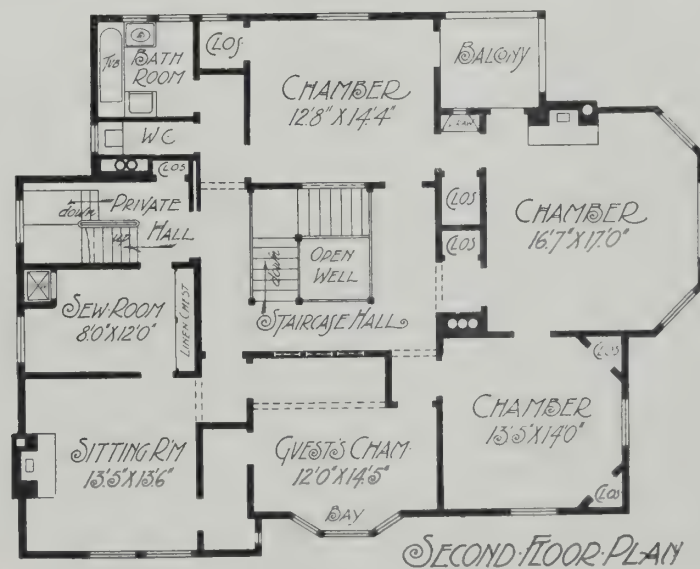
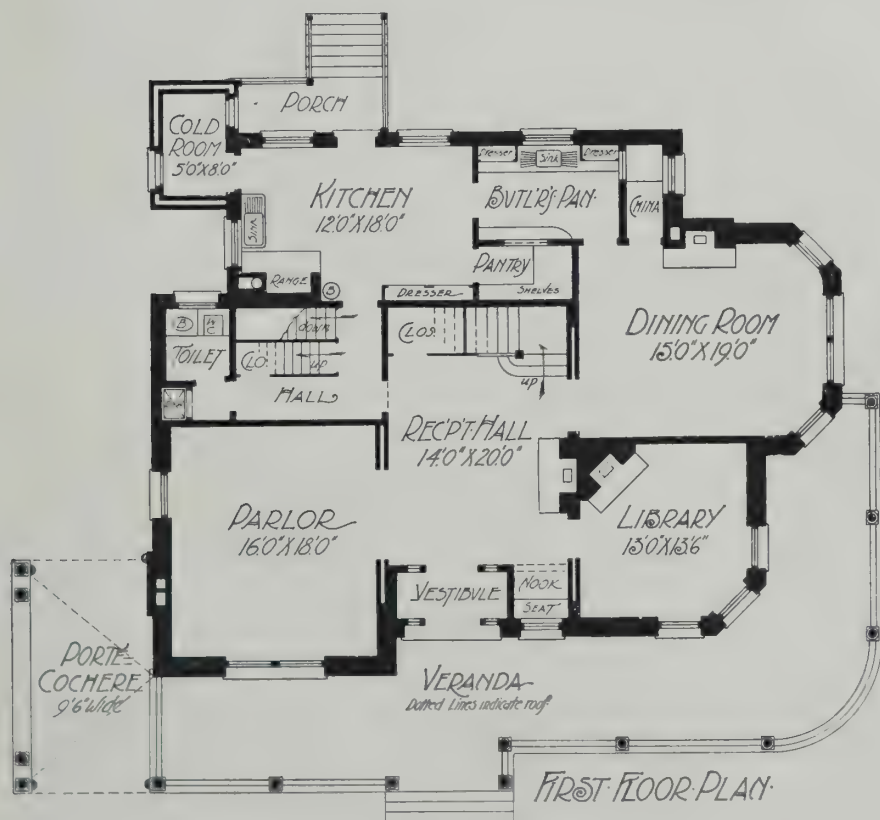
A COTTAGE AT SOUTHAMPTON, L. I.—See page 21.



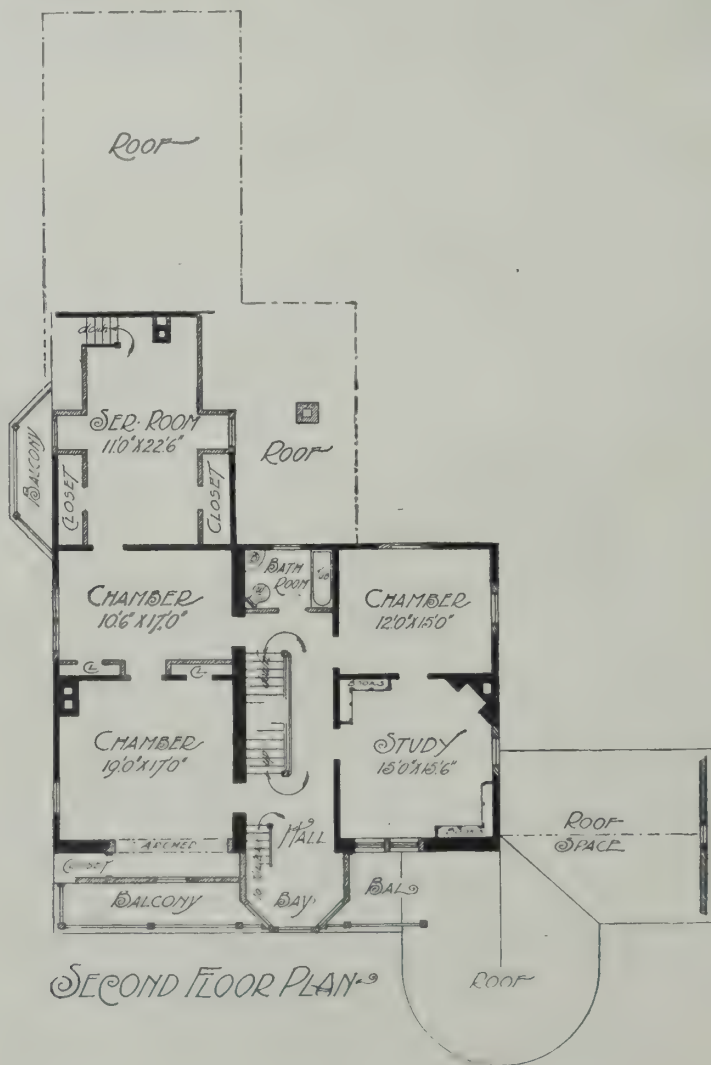
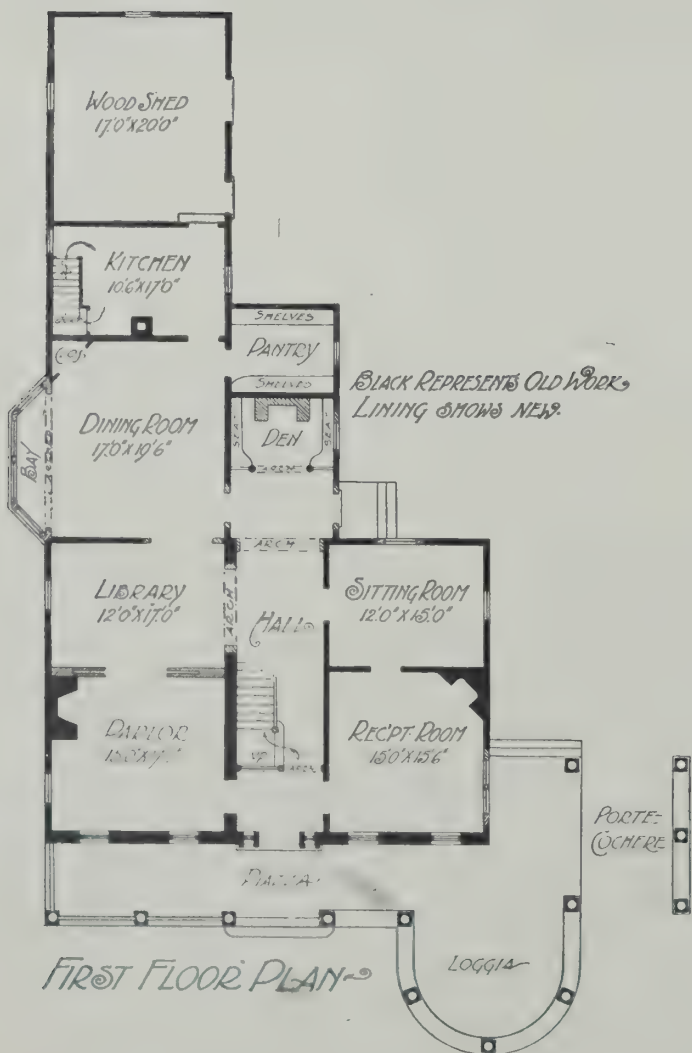
A DWELLING AT GERMANTOWN, PA.—See page 21.



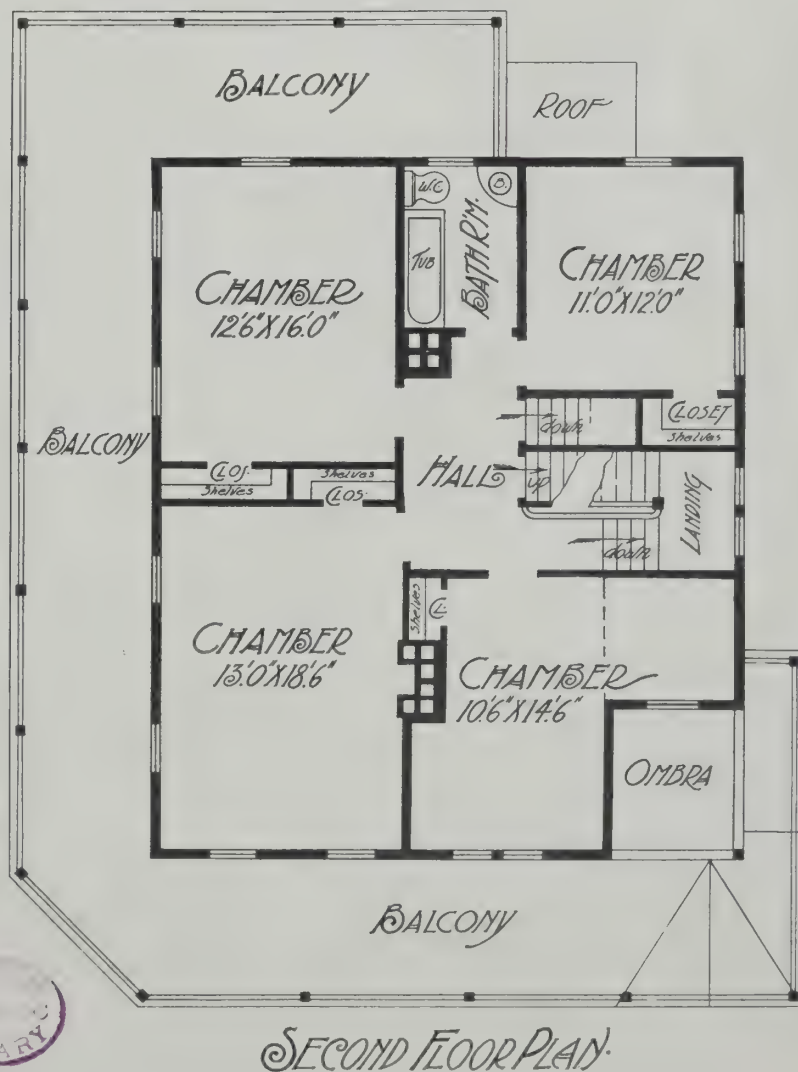
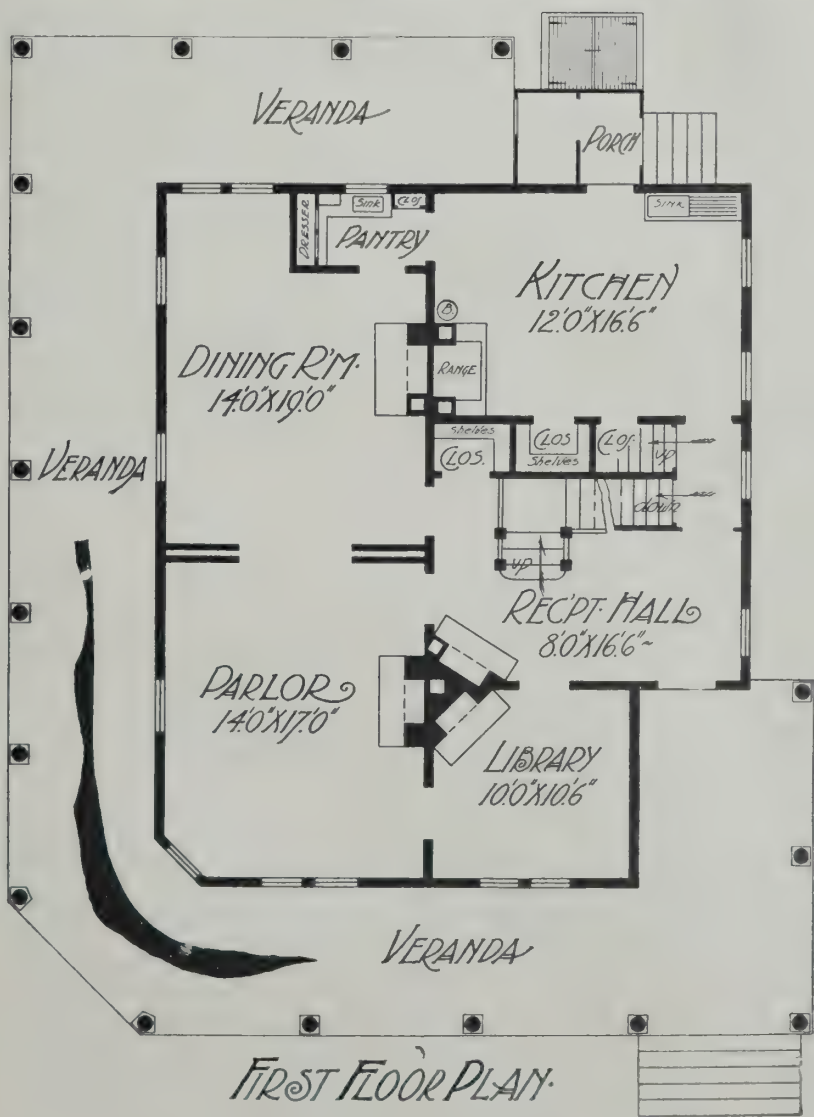
HALL AND LIBRARY, GLEN RIDGE, N. J.—See page 21.



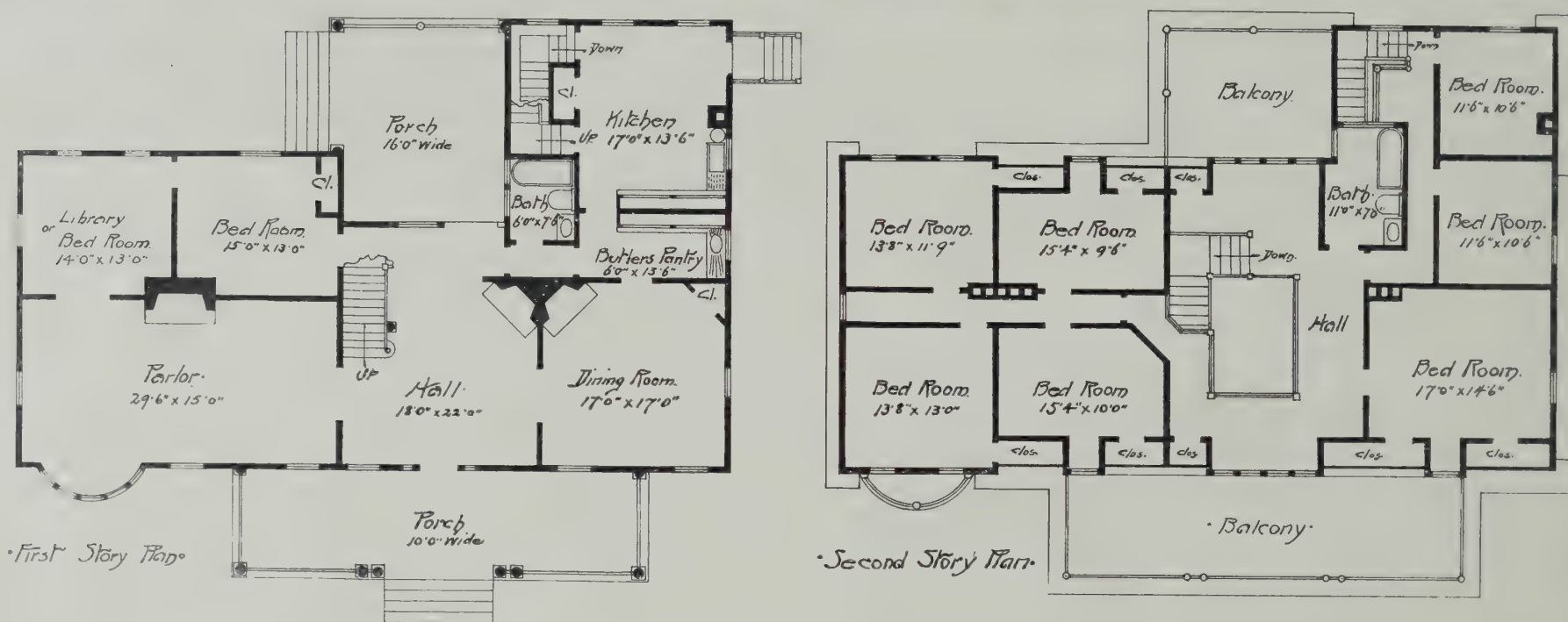
A RESIDENCE AT EAST ORANGE, N. J.—See page 20.



ALTERATION OF BLINN HOMESTEAD, CAMBRIDGE, N. Y.—See page 25.



A DWELLING AT SOUTH ORANGE, N. J.—See page 25.



A HOUSE AT WEATOGUE, CONN.

A HOUSE AT WEATOGUE, CONN.

The engraving given above represents a long, low Colonial house, which is being erected for a summer residence for Mr. Arthur M. Dodge, of New York, at Weatogue, near Simsbury, Conn. The restful and homelike appearance of this house is a justification of the selection of the Colonial style, and the architects have succeeded in combining a correct 1700 effect with the comforts and conveniences called for by home builders at the end of the nineteenth century. There is, as will be seen by the floor plans, an ample piazza, both at the front and rear of this house, and, as it is located, there is a view from each. Rear piazza is at the side of the driveway, and the front and rear doors are equally ornate, and guests can enter the large living hall from either. In the interior, the parlor, hall, dining-room, are all to be thrown into one, if desired, making a vista sixty-five feet long. There is a large, open fireplace for four foot logs in the parlor, and an open fireplace in dining-room and hall. The feature in the hall is the gallery, open to the roof. Second floor has seven bedrooms, two of which are small ones for servants, and the overhanging of the roof is so arranged as to give clear ceilings in each. It is being erected from the plans and under the supervision of Child & De Goll, architects, 62 New Street, New York.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A Complete Pompeian House.

A valuable discovery has been made at Pianella-Settefini, near Pompeii, on the property of a certain Mr. Vincent de Proscio. A house has been unearthed which was covered at the time the city was buried, and it is said to be in a more perfect condition than any building yet discovered. It contains several large apartments and three bathrooms, with the basins in sculptured marble. And with leaden pipes ornamented with bronze faucets. The three rooms correspond, says a writer, in describing the discovery, to the "calidarium, tepidarium, and frigidarium, which were always to be found in ancient houses of the first class. In consequence of the eruption of Vesuvius in A. D. 79, the Pompeian houses brought to light heretofore have been roofless, almost without exception. Fortunately, however, that on the property of M. De Proscio is perfect, and archaeologists are happy over the fact. The roof measures almost forty-four feet in length."

Inventions Reduce the Cost of Building.

The *Real Estate Record* commented some time ago upon the immense reduction that has been made within the last decade in the cost of building. Office buildings that cost \$1.50 per cubic foot, and even more, can be produced by modern methods for 30 or 40 cents a cubic foot. This reduction in cost is due in no slight measure to the employment of mechanical devices in building operations. The hod carrier, elevator, derrick, and other devices worked by steam, which have superseded the slow hand labor, are too well known to be mentioned. The employment of steam power in the mechanical operation of building has, however, by no means reached its limit. At the New York building, now erecting on the block front between Waverley Place and Washington Place, passers-by may see a steam stone crusher at work preparing material for the foundation. A few hands are able to do with precision an amount of work which formerly required a small regiment of men. On the line of the new Lexington Avenue cable road a cement stone mixer worked by steam is in operation, and attracts the attention of passers-by.

Those Dreaded Drafts—How They are Caused and Avoided in Window-Tight Rooms.

As the season is now on when the bald, the thin-blooded, and those whose rheumatics always are in evidence when the glass is in the neighborhood of 30°, start in to look around for drafts about the house. I wish to give my experience in this matter, says a writer in the *Boston Transcript*. Several years ago, in the fall of the year, I was sick for weeks, and when at last I was able to sit up I sat in my sitting-room, which faced the northwest, during the daytime, and, wishing to see the passing, I had my place near a large window. The room had an open grate, also furnace heat, and the thermometer easily registered 70° to 75°, but with all this warmth there was a draft—as I thought—on my head and neck.

Every one said the cold air came in at the window sash. I sent for the weather-strip man, and, of course, he discovered—or thought he did—the cause, and put on his rubber moulding, so that the sash when closed was tight. "Now," he says, "you will have no more trouble in that direction."

The next cold snap the same old gale of wind appeared. When my doctor came in, I spoke to him in regard to it, when he informed me that it was not the cold air from the outside that I felt, but the warm air of the room, which went to the top of the window, struck the cold glass, cooled, and then "fell down," as the cold air would had not the casing been airtight. He then said, "Drop your curtain about one-third, and keep it there."

I did as he directed, and the gale stopped; and I had no trouble after that. He told me that the same trouble existed in most houses, even those that were well heated in the halls and bedrooms. The heat going to the top, cooling and falling back, so that one coming from a warm room downstairs and going up would often think that there must be windows open above. Of course, double windows would remedy this cooling-off process in the rooms, but with the curtains down a little they prevent the instant cooling of the warm air—and there is your draft. You will notice that these "drafts" are about during the day more than at night, and always less in the room where there is a lamp. Why? Simply when you light your lamps or the gas, you draw down the shades, and the heat does not strike the cold glass.

Improved Method of Manufacturing Hydraulic Cement.

In order to render the usual preliminary crushing of cement clinker in stone breakers unnecessary, the patentee adds 5 to 30 parts of granulated blast furnace slag to 100 parts of the ordinary raw materials for the manufacture of hydraulic cement, and burns the mixture in the ordinary way, obtaining a product which is granular and brittle, and can be fed direct to the grinding machinery without passage through a stone breaker. By the use of a larger proportion of slag, e.g., 30 to 125 parts to 100 of cement raw materials, and modifying the process of burning, a product can be obtained similar to hydraulic lime or Roman cement, or Portland cement.—G. W. A. Stein, Wetzlar, Germany.

Fireproof Buildings.

The attention of architects and builders has been directed for some time to the difficult task of constructing an absolutely fireproof building. It has been found that a rise in temperature to 300° F. will throw the heaviest steel columns more or less out of place, and that a rise to 500° F. would ruin the best steel construction. Fireproof buildings are usually constructed, therefore, by surrounding the girders with material to protect them from the heat. An elaborate form of such a construction has been introduced recently in the new Tremont Temple in Boston. It consists in placing about the great steel girders terra cotta blocks on all the exposed sides, and strapping them together with iron. Upon this is stretched expanded metal lathing, covered with a heavy coat of Windsor cement. Over this, in turn, comes iron furring, and this is provided also with a layer of expanded metal lath. The finishing plaster is laid on top of this last layer. It will be seen that this arrangement provides first a dead air space, next a layer of terra cotta, a Windsor cement covering, then a second air space, and finally a second thick layer of Windsor cement.

The Great Staircase in the Capitol Building, Albany, N. Y.

During the past year the imposing stone staircase at the west entrance of the Capitol building at Albany, N. Y., has been practically completed, and as it now stands the stairway is one of the most beautiful constructions of its kind in the world. The entire cost of construction has been nearly \$1,000,000, and about five and a half years have been consumed in building it. The staircase occupies a space of 76 feet 10 inches by 69 feet 10 inches, and the height from the tile floor of the first story to the uppermost cornice in the dome is 119 feet.

The stairway consists of broad central rows of steps, starting in the corridors and extending through the centre openings between the cylindrical piers. The lower steps of each flight are constructed in convex curves, which serves to increase the length of the steps and makes it possible to introduce a platform or break in the steps about one-third the way up each flight. These platforms in turn are flanked by short rows of stairs on two sides, which extend at right angles to the main or central flights. These secondary flights extend to platforms which reach to the walls, and from these platforms next the walls four rows of steps, two from each platform, extend upward to the next floor, which also forms the landing of the central flight.

It will be seen that this construction provides for four walls, and these help to provide a plentiful supply of light and air to the lower floors. The central portion of the stairs is supported by eight bearings resting upon moulded granite bases, and extending up from the foundations to a height of three and a half stories.

The decorations of the staircase are very elaborate. On the central ledge on the north side for example, there is a head of Columbus carved in relief, with the three caravels used by him in the first voyage to America. The western ledge is decorated with the Viking ship, while on the east ledge is a modern steamship, both of these being in bass relief. The sculptured work is cut upon a plain surface surrounded by rich foliage. The rails, the steps the ledges upon which the balustrades rest, and in short almost every exposed surface is also richly and tastefully decorated.

Porous Glass for Windows.

The latest hygiene craze in Paris is the use of porous glass for windows. This is declared to possess all the advantages of the ordinary window framing, and, while light is as freely admitted as through the medium of common glass, the "porous" further admits air, too, the minute holes with which this is intersected being too fine to permit of any draught, while they provide a healthy, continuous ventilation through the apartment. — *The Hospital*.

Mexican Onyx.

Mexican onyx has suffered a gradual decline in value for many years past. It is generally becoming known that Mexican onyx is not true onyx, but a species of marble. It is really an aragonite, and is composed of calcium, oxide of iron and magnesium. The presence of these last two elements gives it its beautiful color. It is said the use of African marble and other cheap stones is replacing it.

Mexican onyx is easily worked, and has been used not only for building purposes, but for ornamental household articles, such as lamps, table tops, mantels, etc. It was used by the ancient Mexicans for masks, idols, and similar small objects. The price of all such articles has of late considerably decreased. Mexican onyx now sells in the rough at from \$6.00 to \$20.00 a cubic foot. Very large pieces bring more than this proportioned price. When it is sawed into slabs, \$2.00 per cubic foot is added to the price. The polishing, furthermore, greatly increases the value of the stone. In many cases there is a loss of 40 per cent. of material in preparing it for wainscoting, so that the finished product is worth about \$6.00 a foot. The material is too valuable to be used in places where it would be exposed to the weather.

THE MANHATTAN LIFE BUILDING, NEW YORK.

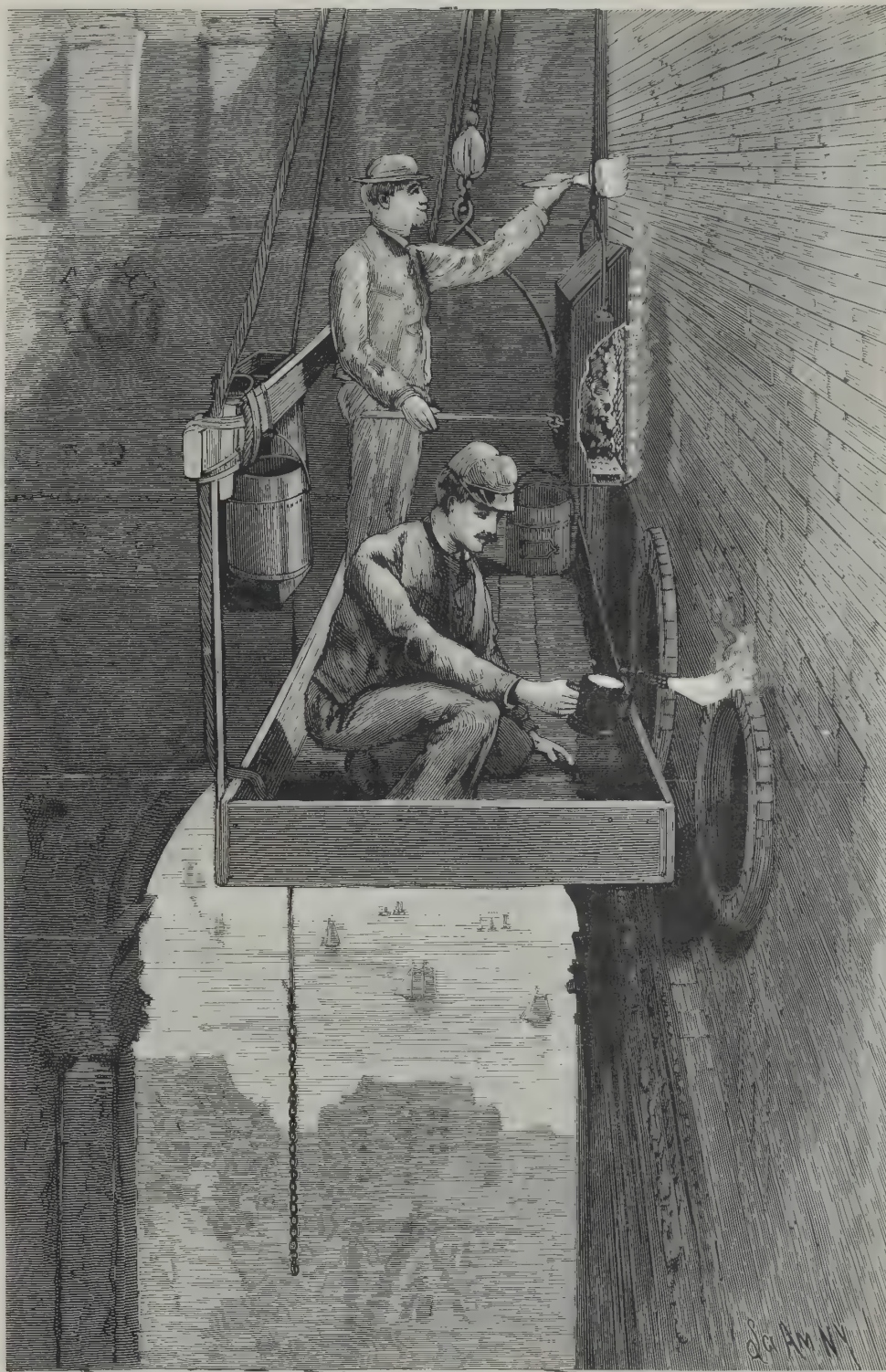
This recently completed building, which rises 347 feet above the sidewalk, and has foundations which go down 53 feet below the same level, is claimed to be the highest office building in the world. Its architects were Messrs. Kimball & Thompson, of New York, and its front, on Broadway, is of granite, while its rear on New Street is of buff brick. The foundations are masonry piers carried by steel caissons, as they had to be sunk below water level in the ground. The front of the building is practically self sustaining, but contributes nothing toward the support of the interior, all of which is carried by interior pillars and the steel framework, the cantilever system being largely used in the foundation, where great trusses are made to carry the columns, and the side wall columns rest upon the outer ends of the cantilevers.

The interior work of this building is of the finest as well as the best and most durable description. One

drier than it would be were the bricks used in their natural state.

In the Manhattan Life building some of the brick were buff colored and others were red. The latter had to be painted, and the Caffall process was applied to red and buff alike, for it has been found to be an admirable preliminary for painting operations, as brick thus treated absorb paint far less greedily than do the natural brick, and as the paraffine excludes the possibility of alkaline matter from the cement exuding from the pores of the brick, the oils of the paint are prevented from saponification. The mechanical action of such salts is also prevented.

Paraffine is, of all chemical substances, one of the most difficult to decompose, except by very high heat. It is one of the most water repellent substances known, so that brick or stone, whose pores are filled with it, is in the best possible condition to resist moisture permanently. It has been found that years of exposure have no effect upon the preparation. While the stoveful of burning



WATERPROOFING THE WALLS OF THE MANHATTAN LIFE BUILDING, BY THE CAFFALL PROCESS.

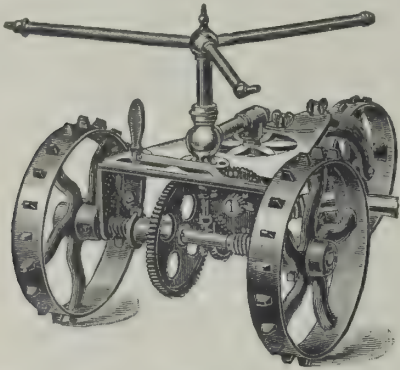
detail of this work is shown in the accompanying illustration, the waterproofing of the brickwork, as executed by the Stone and Brick Waterproofing Company, No. 132 Nassau Street, New York. The method employed is known as the Caffall waterproofing process, which was applied to the Central Park obelisk, and there proved completely successful in preserving the stone from disintegration by the extremes of the American climate. The wall surface is first heated and then melted paraffine is applied before it cools. For the flat surfaces the workman is provided with a sheet iron stove, supplied with charcoal. This is held with its face against the wall, and as the charcoal burns it heats the portion in front of it to about the temperature of boiling water. The workman has at hand a pot of melted paraffine wax. This he applies by a brush to the heated bricks, constantly moving the furnace and working on the heated portion. The hot bricks absorb the melted paraffine rapidly, and are thereby rendered impervious to moisture, and after the treatment no vegetable growth can appear upon them. The interior of the building will be far

charcoal is very hot the walls treated are but slightly heated thereby. A temperature of but 200 degrees is required for the process, and any such temperature will not affect the most fragile stone. Very exhaustive tests have been applied by scientists to determine whether any injury can be done to building stone by its application, and it has been found that no injury was done, and the idea that high heat in this process was applied to the stone has been found to be fictitious. In places about a building where the large, flat-face stove cannot reach, the blast lamp or blow-pipe is used, and in the cut one of the workmen is shown using this instrument. The cut also shows the construction of the stove with open front, and suspended from a pulley with a counterpoise. A little shelf or ashpan is secured below the perforated bottom of the stove to catch any ashes. There is a handle by which the stove is moved about from place to place. The melted paraffine is applied to the portion of the bricks just heated. The first application of the paraffine darkens the color of some stones. For such cases a process is subsequently applied which restores perfectly the original color.

THE Arabol Manufacturing Co., 13 Gold Street, New York, invite particular attention to their Sphinx gum for hanging lincrusta-walton, heavy leather and pressed papers, and refer, by permission, to Messrs. Fr. Beck & Co., leading artistic decorators, who have used the composition with good results in their own work. Sphinx gum has the necessary strength and consistency for hanging lincrusta-walton and pressed paper, is always conveniently ready for immediate use, dries rapidly, and has the great advantage of not swelling and soaking relief papers, as is the case when ordinary flour paste is used.

A TRAVELING LAWN SPRINKLER.

The sprinkler shown in the illustration has the capability of moving itself over a lawn, under a moderate and ordinary pressure of water, dragging, if necessary, 100 feet of hose. It can be set to travel in a straight line or in a circle, at a speed of from 15 to 500 feet per hour, and has a figured dial by which it can be set for the required



THE "LITTLE GIANT" LAWN SPRINKLER.

distance and speed, when it stops automatically. It can be gauged to throw the water over a space of from 5 to 50 feet in width, or it may be used as a stationary sprinkler by throwing it out of gear. This sprinkler is sold by the E. Stebbins Mfg. Co., brass founders and finishers, of Brightwood, Mass.

"LAMBERT'S Suburban Architecture" is the title of a recent publication on suburban and country homes. It contains many illustrations and considerable letterpress. It gives photographic views of houses actually erected, tells where the buildings are located, by whom built, and has several pages of testimonials. It is issued by Wm. A. Lambert, 116 Nassau Street, New York.

Egyptian Cement Plaster.

By J. M. BELL, M.D., Professor of Chemistry, Central Medical College, St. Joseph, Mo., and member of American Chemical Society.

The destruction of the Alexandria Library by the Arabs, an initial step in the long train of events which led to the settling of that black cloud that during the Middle Ages smothered the learning of Egypt, Greece and Rome, has been lamented by investigators in all lines of human industry. In recent years archaeologists have accomplished much in unraveling the mysteries of the past by incessant digging, by observing the indelible thumbprints left upon nature, and by deciphering the many hieroglyphics. By these clues as a basis for deductive reasoning, a fair picture of the life and works of the ancients has been drawn. In some cases, results have suggested methods of procedure to modern artists architects, and mechanics; but in many cases involving chemical decomposition, we have been unable to determine by results the precise nature of raw materials used and processes involved; for, as is well known, in the blending of elements, compounds are formed which no amount of *a priori* reasoning could have anticipated; and, on the other hand, after decompositions have taken place, the end products in many cases furnish no clue as to which of many known or unknown procedures had been followed. Conspicuous in the category of problems remaining unsolved are the nature of their brilliant and permanent pigments and dyes, and the cements used by the builders. In spite of the progress which we of the nineteenth century are making in all fields, the pyramids, as an example of Egyptian ingenuity, are still the cynosures of all mechanical eyes. But beyond the mere mechanical feature is a remarkable chemical one, in the nature of the cement used in the building of them. The chemistry of building cements has been studied closely for years, and much has been learned that has increased the possibility of perfecting such an article. For a long time these conjectures were matters of curiosity, but now that our buildings are become as massive and ponderous as some of those ancient heaps of masonry, we are confronted with the problem, which must be met, not as a matter of scientific interest only, but as a cold, hard business necessity:

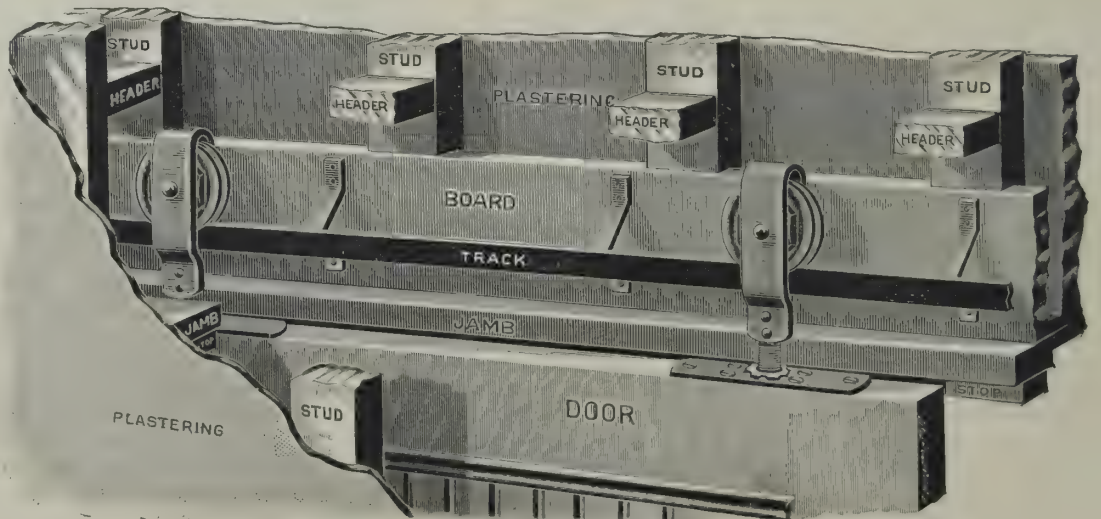
How can we nearest approach to that ancient building cement?

In order to arrive at the conclusion most directly, attempts have been made to determine the origin of the Egyptian cement, and, if possible, duplicate the process with material taken from the soils. The conjecture which seems most reliable and plausible is that the cement was made from earthy deposits taken from the bank of the Nile, about 18 miles away. Since the essential features of cement are aluminium and calcium compounds, which are insoluble to any extent in river water, and since Nile mud deposits would consist largely of these elements, left as the river subsided, while the more soluble potassium, sodium and magnesia compounds, with phosphorus and chlorine, would have been absorbed by alluvia and appropriated by vegetation, this hypothesis seems reasonable. Such a deposit, properly treated, would have resulted in the formation of a perfect cement. In America many processes adopted have reproduced a cement resembling the Egyptian compound, but some qualities have been lacking. The compound which most nearly approaches this ideal blending of qualities was unearthed in Dickinson County, Kansas, three years ago. While making an analysis of this earth, I felt convinced that it contained as nearly as could be almost all the qualities necessary to the realization of a perfect cement—one that could be used in massive structures, and be enabled to withstand the disintegrating influence of atmospheric changes in this country. A necessary factor in such cement is aluminium, in that it resists decomposition to a greater extent than iron and such elements. Its light specific gravity and hardness render it of special value, and the fact that it resists oxidation to a remarkable degree places it as a factor of utmost importance in cements to be used in expensive and massive structures. The large percentage of aluminium in this earthy deposit led some Missouri cement men to investigate it with a view of using it in cement work. After several months of experiment and trial it was found to contain all the properties anticipated by the analysis, so the entire tract of land was controlled by a St. Joseph syndicate, and the finished product (aluminite) put on the market. Aluminite, after two years' public career, has proved to builders a boon, since it has enabled them to carry into execution plans long anticipated, but delayed in the absence of a cement of high tensile strength, non-porous, and adapted to resist moisture, fire, and frost.

The advent of aluminite has thereby revolutionized building procedures, since it has embodied this unusual blending of desirable qualities. The Dillon Cement Plaster Company, of St. Joseph, Mo., who own and operate aluminite mills, have already established a national reputation, not merely through aluminite, but because of the series of elaborate investigations they are constantly making to advance the interest of cement plaster throughout the country.

Ornamenting Glass.

A new method of ornamenting glass has been discovered recently by Gorlitz, of Zurich. The method is not a very expensive one, and the results obtained are said to be very beautiful. The design to be reproduced on the glass is first engraved "positively" on a printing plate of rubber, and this plate, after being coated with varnish, is pressed against the glass. The glass is then covered with bronze powder, or other suitable material. The portions forming the design will remain empty and therefore transparent. The glass is then placed in a frame which has a backing of strong paper board, over the front of which is mounted a bright sheet of tinfoil or tin plate. It will be seen that the design will therefore be shown by a reflected



LANE BROTHERS' PARLOR DOOR HANGER.

light through the transparent portion of the glass, while its other parts will form a background stamped in relief. The common plan for producing enameled writing and designs in relief on glass has been to apply enamel paint by means of a brush.

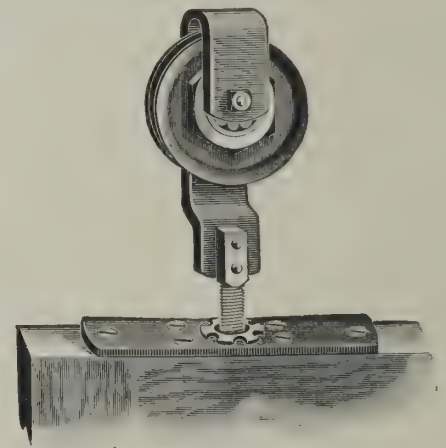
A Bridge of Concrete.

A concrete bridge having a clear span of 164 feet and 26 feet wide was recently constructed over the Danube at Munderkingen, in Austria. Stone is scarce and dear there, while good Portland cement is produced in large quantities. The centring was covered with oiled paper, on which the concrete was laid, consisting of 1 part cement, $2\frac{1}{2}$ parts sand, and 5 broken stone, all thoroughly mixed. Blocks of this concrete have shown a resistance of 187 tons per square foot in seven days, 235 tons in twenty-eight days, and 308 tons in five months. The concrete was applied in layers 12 inches thick, starting at the abutments and working toward the crown, where it is $3\frac{1}{4}$ feet thick; midway to the crown it is $4\frac{1}{2}$ feet thick. The time spent in laying the concrete was only nineteen days, and ten days after the centres were struck. The deflection proved less than $4\frac{1}{4}$ inches.

THE Cortright Metal Roofing Co., of Philadelphia and Chicago, have a system of roofing, which embraces metal slates, Victoria shingles and trimmings for ridges, hips, valleys, etc. The goods are made of tinplate, galvanized steel or copper, and are especially desirable where a fire-proof, stormproof, ornamental and durable finish is required. The tinplate used is all full weight, 10 light-weight plates or wasters being handled, and the present low price of tin puts the company in a position to sell their product at very reasonable prices. Customers in the East and South are directed to the main office, at Broad and Hamilton Streets, Philadelphia, while those in the West can be supplied from 134 Van Buren Street, Chicago, Ill.

NEW MODEL PARLOR DOOR HANGER.

The accompanying cuts represent a new parlor door hanger, which Lane Brothers, of Poughkeepsie, N. Y., have designed and placed on the market, to supply the increasing demand for a thoroughly first-class article, at a moderate price. It is made entirely of steel, and all parts are tinned. The wheel is fitted with roller bearings, running on a hard steel bushing, making it anti-friction and never requiring oil. The wheel is noiseless in action, owing to its having vulcanized fibre filling. The adjustment of this hanger may be accomplished from either above or below the base plate. The adjustment nut extends entirely through the plate, having serrated projec-



tions both above and below, by which it may be turned. This permanently fastens it to the plate, and it cannot work out or be lost. In many cases the new model may be adjusted from the end of the door, and this hanger is particularly well adapted to single doors, where it is impracticable to run them out far enough to get on the rear

edge of the door, in which case it may be easily adjusted from the side by simply removing the stop. Both hangers of a pair are alike, and there are consequently no rights or lefts. The manufacturers would be pleased to give additional particulars on application.

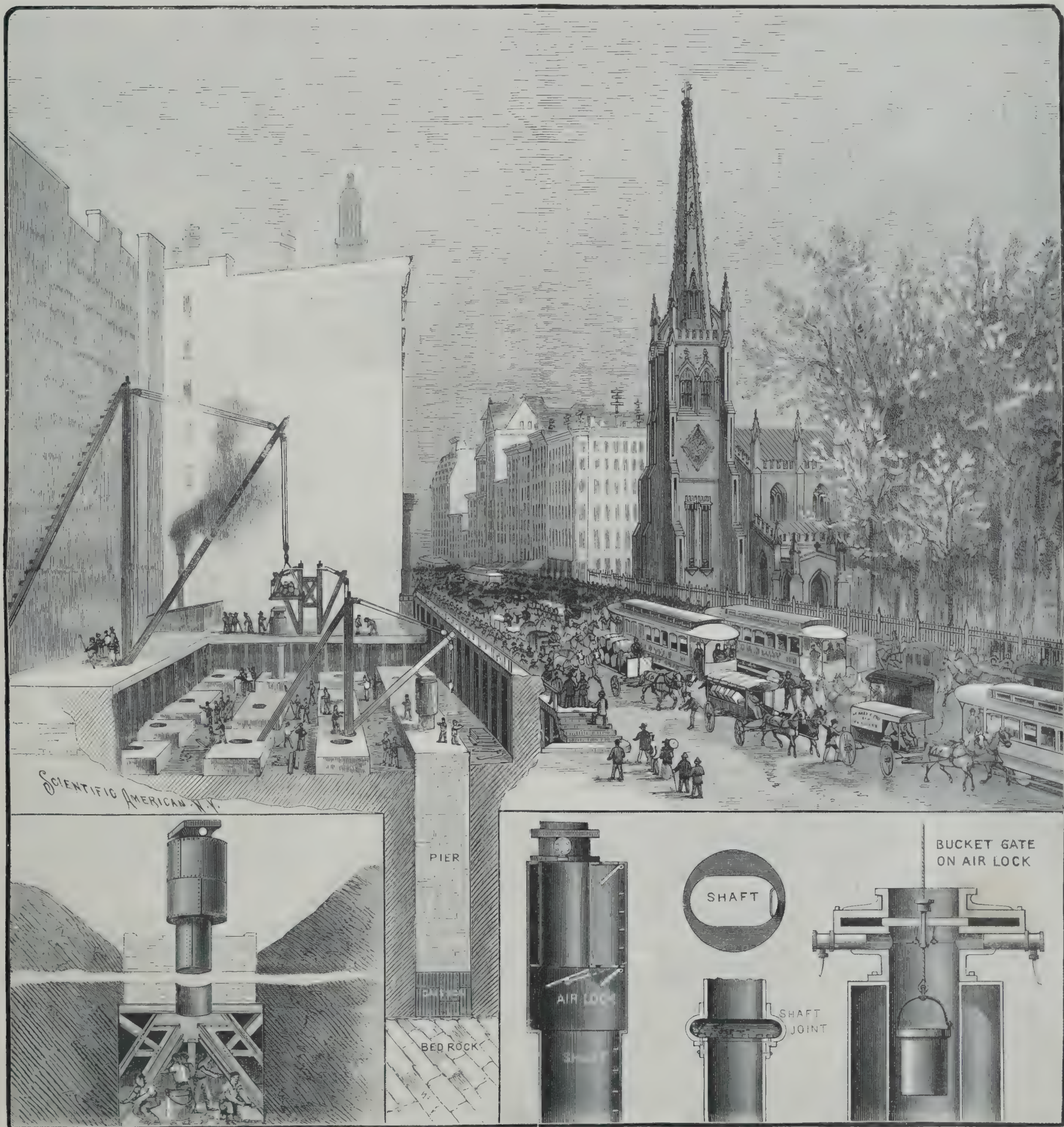
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FOUNDATION PIERS OF THE AMERICAN SURETY COMPANY'S BUILDING, NEW YORK CITY.—See page 50.



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A. E. BEACH.

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THE

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BUILDING EDITION.

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This is a special Edition of THE SCIENTIFIC AMERICAN, issued monthly. Each number contains about 32 large quarto pages, forming, practically, a large and splendid Magazine of Architecture, richly adorned with elegant plates in colors and with fine engravings; illustrating the most interesting examples of modern Architectural Construction and allied subjects.

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SCIENTIFIC AMERICAN, BUILDING EDITION.

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A COTTAGE AT MOUNT VERNON, N. Y.

The illustration in colors on our front page cover, the additional view on page 39, and the view, with plans, on page 51, show the residence of Mr. Stevenson, at Mount Vernon, N. Y. Dimensions: Front, 32 ft.; side, 46 ft., exclusive of all bay and veranda projections. Heights: Cellar, 7 ft. 6 in.; first story, 10 ft.; second, 9 ft. 2 in.; attic, 8 ft. 6 in. Our views show an exterior of broad treatment; well shaded veranda, projecting bays, balcony, ombra and tower being the principal features. Underpinning of light stone; framework above sheathed, papered, and covered with clapboards and round butt shingles, painted yellow. Roof, gray slate. Trimming colors, yellow and white. First floor plan shows a wide reception hall, with open fireplace, tiled in light blue, with triple arched mantel of oak, supported by long columns. Staircase has carved newel, with candelabrum, goosenecked rail and turned balusters. Circular landing inside of conservatory, which has cement floor, and is finished in oak. Reception room has bay, full width. Parlor, with bay, has angle fireplace and oak cornice moulding, the same as reception room, and connects with dining-room, also having angle fireplace, with long columns supporting mantel, glazed with beveled glass and tiled. Butler's pantry has sink, dresser and high oak wainscot, continuing around kitchen, complete with all fixtures. Flexifold doors of oak connect the principal rooms with hall. Plaster throughout. King's Windsor cement, hard finish. Second floor plan shows five chambers and bathroom, with tiled floor and wainscot, porcelain tub and other fixtures of best make, plumbing throughout exposed. Third floor divided into three chambers, tower and trunk room. Finish, except where noted, as follows: First floor, oak; second, cherry; third, oak; floors double throughout; light oak with darker border in principal rooms. Cellar, cemented, contains hot water heater, fuel storage, etc. House is lighted by gas and electricity, and has a complete burglar alarm and electric indicator system. H. S. Rapelye, architect, Mount Vernon, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A HALF-TIMBERED COTTAGE, GLEN RIDGE, N. J.

Our illustration on page 40 shows "The Gables," an interesting half-timbered cottage recently completed at Glen Ridge, N. J. Dimensions: Front, 28 ft.; side, 28 ft. 10 in., exclusive of veranda and extension, which is 5 ft. 8 in. Heights: Cellar, 7 ft.; first story, 9 ft.; second, 9 ft.; third or attic, 8 ft. Underpinning of local stone; exterior framework at first story and gables covered with plaster, gray in color, timbering painted darker; second story shingled; roof slated. The features of the design are its porch with gables above, and the two gables breaking out from main roof, all effectively timbered. The bays beneath relieve the front elevation. Upper panel of entrance door, which is painted green, glazed with leaded glass; panels below being red, tipped with yellow; there is a reception hall of good size, with circular arch in front of fireplace, of brick, with hood and shelf above. Staircase of easy rise, having oak treads, risers same as finish, cream, turned balusters and newel. Plaster in principal room is sand finished, hall being tinted terra cotta, frieze and ceiling lighter. Parlor, in cream, has angle fireplace, tiled in white, with paneled mantel over. Walls tinted light yellow, different tint for frieze and ceiling, hard wood floor. Dining-room with bay full width, fireplace in corner, and china closet (walls tinted green, lighter frieze and ceiling), connects with kitchen, complete with usual fixtures through. Butler's pantry contains dresser, sink, etc. Second floor plan shows four chambers, principal ones having fireplaces, all with closet room. Bath with usual fixtures. Attic has three rooms finished off, and storage place. Cellar, cemented, contains furnace, fuel storage, and closet, four steps down from kitchen, under the steps to main stairs. Chas. E. Miller, architect, 258 Broadway, New York City.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT GREAT DIAMOND ISLAND, MAINE.

We present herewith on page 45 a cottage recently erected for H. M. Bailey, Esq., at Great Diamond Island, Maine. Dimensions: Front, 28 ft.; side, 39 ft., exclusive of piazza. Height of ceilings: First story, 9 ft.; second, 8 ft. The design is a unique example for an island cottage, provided with abundant piazza room, well shaded, and a tower with outlook at second story. The rooms are so arranged as to give the best possible comfort and convenience. The staircase rises up to second floor from dining-room, thus avoiding draughts if placed in living room. The living-room is provided with an open fireplace built of brick, with hearths and facings of same and a neat wood mantel, and is separated from dining-room by an archway with spindle transom. Kitchen is provided with dressers, sink and a large pantry. Servant's bedroom is conveniently located. Bathroom is fitted up replete. Shed contains ample space for storage, with entrance thereto. Second floor contains four bedrooms, large closets and balcony. The walls and ceilings

throughout the interior are not plastered, but left with the beams exposed to view and finished natural. The trimmings and casings are turned out of spruce, the doors of pine, and the floors are laid with yellow pine in narrow widths. The cellar under building is inclosed with narrow beaded stuff, with latticed windows. The building is supported on cedar posts with stone footings, and the cellar has an outside entrance. The building above is sheathed with spruce, and the first story is covered with clapboarding and painted olive yellow, while the second and third stories are covered with shingles and stained sienna. Roof shingled and painted red. Mr. John Calvin Stevens, architect, Oxford Building, Portland, Maine.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT ARMOUR VILLA PARK, NEW YORK.

We present on page 46 a dwelling, recently completed for J. E. Kent, Esq., at Armour Villa Park, New York. The design is very picturesque, and has several good features, including the piazza, which is private and separate from entrance porch. The underpinning is built of local field stone, laid up at random. The building above, of wood, is covered with clapboards, and painted Colonial yellow, with ivory white trimmings. The roof is shingled and left to weather finish. Dimensions: Front, 33 ft. 6 in.; side, 43 ft. 6 in., not including piazza and porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. 6 in. The floor plans are most excellent. The interior throughout is trimmed with North Carolina pine, and finished natural, and the floors are laid with similar wood and oiled. The hall contains an ornamental staircase and a paneled divan, and the doorways are fitted up with spindle transoms. Living room is furnished with a large, open fireplace built of brick, with facings and hearth of same and a hardwood mantel. Dining-room is well lighted, and it has a door window opening out upon the piazza. Kitchen, pantries and rear hall are wainscoted with narrow beaded stuff, and each apartment is fitted up complete. The second floor contains four bedrooms, nine closets, dressing room and bathroom: the latter is wainscoted and furnished with the usual fixtures. Third floor contains two bedrooms and trunk room. Cemented cellar contains store room, furnace room, laundry and other apartments. Cost \$5,200 complete. Mr. W. W. Kent, architect, 1262 Broadway, New York City, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

COTTAGE AT NEW ROCHELLE, N. Y.

We give on page 48 a residence recently completed for Mr. C. W. Howland, at Residence Park, New Rochelle, N. Y. The building, as shown in the engravings, presents a most unique example for a modern dwelling house, and it is treated in Colonial style. The elevations are well treated with bay windows, piazza and an ornamental chimney. The underpinning is built of rock-faced stone, laid up in a rough manner. The first story is clapboarded, and painted white, while the second and third stories are shingled and left to weather finish. The roof is also shingled, and finished natural. Dimensions: Front, 32 ft. 6 in.; side, 44 ft., not including piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The plans are unique. They present good sized rooms, well arranged for light and ventilation, and treated with Colonial detail. The hall is trimmed with oak, and it contains an ornamental staircase, carved, and lighted by a cluster of stained glass windows with excellent effect. The remaining apartments are trimmed with whitewood. Den is a unique room, with bay window and paneled seat. Parlor and dining room each have open fireplaces that are trimmed with tiles and furnished with hardwood mantels made from special designs. Kitchen, laundry and pantries are wainscoted with narrow beaded stuff, and each is fitted up with the usual fixtures complete. The second floor contains four bedrooms, five closets, and bathroom; the latter is wainscoted and furnished with the usual fixtures, with exposed plumbing. Two bedrooms and trunk room on third floor. Cemented cellar is furnished with furnace and other necessary apartments. Mr. G. Kramer Thompson, architect, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

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A RESIDENCE AT MONTCLAIR, N. J.

Our plates on page 43 illustrate the residence of Chas. N. Marvin, Esq., on Mountain Avenue, Montclair, N. J. The design is successfully treated in the Flemish style. Underpinning, part of tower and chimneys are of local stone, laid random rubble, red mortar joints; exterior framework above being sheathed, papered, shingled and stained sea-green. Trimming colors, brown and gray. Dimensions: Front, 43 ft. 6 in.; side, 37 ft., exclusive of projections. Heights: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft.; attic, 8 ft. 6 in., except tower room, which is 10 ft. The main features of the design are the broad treatment of main roof, corner tower, porte-cochère, well shaded veranda and bays. The arches, casing of the reveals, and swellings show how effectively shingles may be utilized. The plan is very conveniently arranged, no expense having been spared to make the house pleasant and comfortable. Upper part of Dutch entrance door is divided into small squares of leaded glass, amber in color. The hall is a cheerful feature of the arrangement, having a broad fireplace, tiled in seal brown, with columns supporting

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A HOUSE AT ELIZABETH, N. J.

We present on page 42 this issue of SCIENTIFIC AMERICAN an illustration of the residence of Mr. Henry A. Haines, Newark Avenue, Elizabeth, N. J. This fine, large, Colonial house gives an impression of size from the outside and room on inside which is far out of proportion to its cost. It is considered one of the finest houses in Elizabeth, and the tower, conservatory effect, and the Colonial decorations have been greatly admired. The house is upon the corner of two streets, and has a piazza facing on both of them, as well as a small rear piazza convenient for entrance to kitchen. As you enter the double Colonial front doors, which are supplemented in winter by ornamental storm doors, you come into a hall which is 16 ft. 5 in. in width, and which has fluted columns and spindles, and large, open fireplace. On the right of the hall is the reception room, which is connected with

A RESIDENCE AT FLATBUSH, L. I.

The subject of illustration on page 41 is the residence of C. H. Wheeler, Esq., in Tennis Court, Flatbush, L. I. The exterior is broadly treated, with overhanging gables, dormers, balcony, and well shaded veranda running the full front, the roof of which is supported by Tuscan columns, placed on shingled rail. Dimensions: Front, 42 ft. 6 in.; side, 66 ft., including extension, but not veranda projection. Heights: Cellar, 7 ft.; first story, 10 ft.; second story, 9 ft.; attic, 8 ft. Underpinning of brick, 12 in. in thickness; exterior framework above sheathed, papered, clapboarded, and painted light yellow on first story, all above, including roof, being shingled and left to weather. Trimming color dark, and blinds light gray. Lattice work yellow. The principal feature of the first floor plan is the music room, trimmed in cypress, which runs full depth of main structure, has bay with seat, and connects with dining room through 6 ft. sliding doors with elliptic head. This room has angle fireplace and china closet, bay with seat and closet, and is trimmed in quartered oak. Butler's pantry has large dresser and sink, and is means of passage to kitchen, complete with

**A COTTAGE AT MOUNT VERNON, N. Y.—See page 38.**

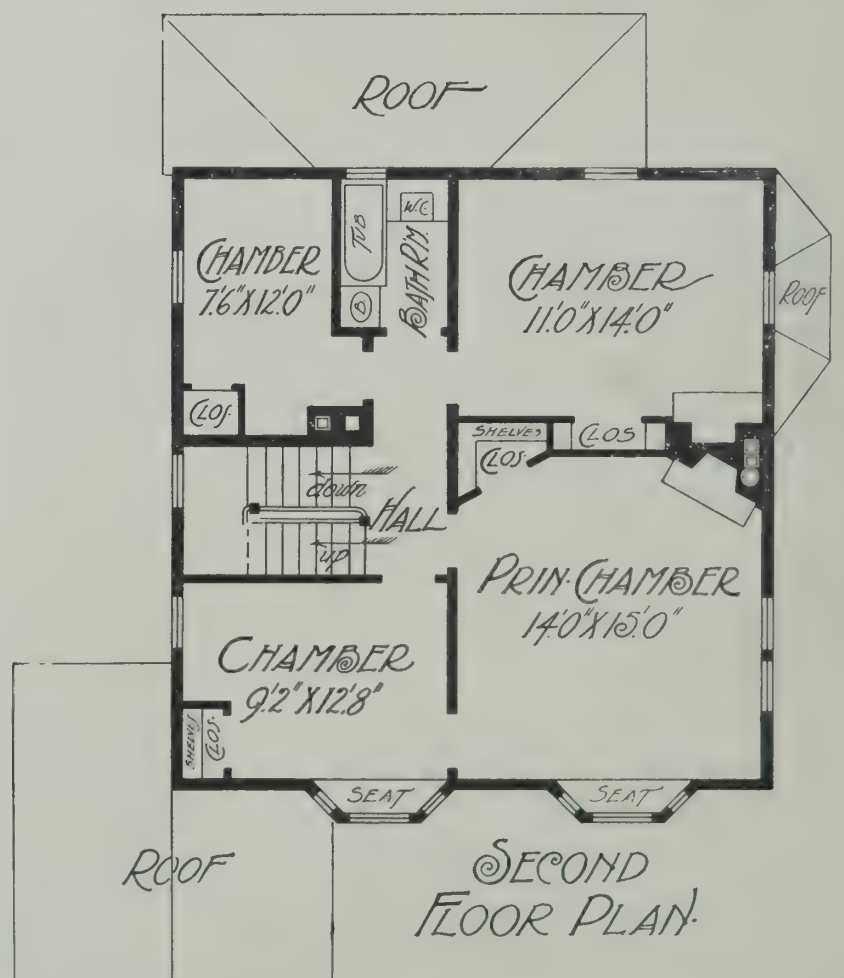
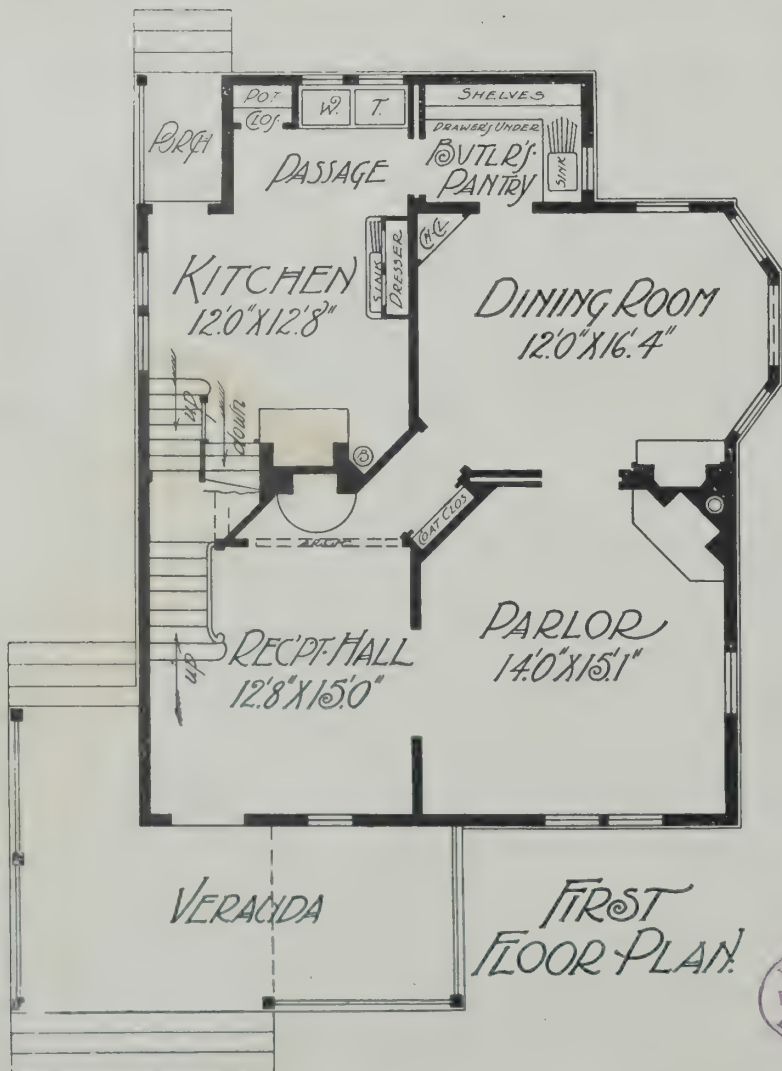
wooden hood above; wide, arched, mullioned window glazed with leaded glass of appropriate design at other end; wainscot 4 feet high; ceiling ceiled with wood and arched over, with beams exposed; stairs, of easy rise, have long balusters of rope design reaching to string above, newel square and fluted, all in oak; walls tinted terra cotta. Reception room in flesh tinted plaster, and white trim nook in bay. Sitting room with bay its full width; wide fireplace, tiled in gray, same as hearth; four long columns support mantel with large beveled mirror. Dining-room connects by wide sliding doors, has windows its full width, well up, with buffet beneath. Mantel, tiled in brown, has oblong beveled mirror; finish, oak. Butler's pantry, kitchen and laundry complete with usual fixtures. Second floor plan shows five chambers, two with dressing-rooms, ample closet accommodations, and bathroom with fixtures of best make, all plumbing exposed. Attic has servant's, tower and storage room finished off. Cellar, cemented, contains furnace, fuel bins, etc. House is lighted by gas, and was built under the supervision of Albert V. Porter Esq., architect, 766 Lexington Avenue, Brooklyn, N. Y.

the parlor and conservatory, and has between it and the conservatory large leaded glass windows. This gives a view of the plants from the hall and from reception room. The parlor is connected in the same way with the conservatory; is finished in old rose and silver, and has an arched window seat with columns. The ceiling is decorated with Colonial festoons, fuchsias, and a flight of swallows. At the rear of the main hall is the owner's den or private room, in which are placed his desks and bookshelves. There are a large butler's pantry and a well lighted and complete kitchen. The second story of this house contains six bedrooms, all amply supplied with closets, the front bedroom having an arched bay as arranged in parlor. Contains a bathroom, separate toilet room, and maid's closet. There are three rooms finished in the attic, the large, fine room in the tower being used as a children's play-room. This house was designed and constructed under the supervision of Child & De Goll, Architects, 62 New Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

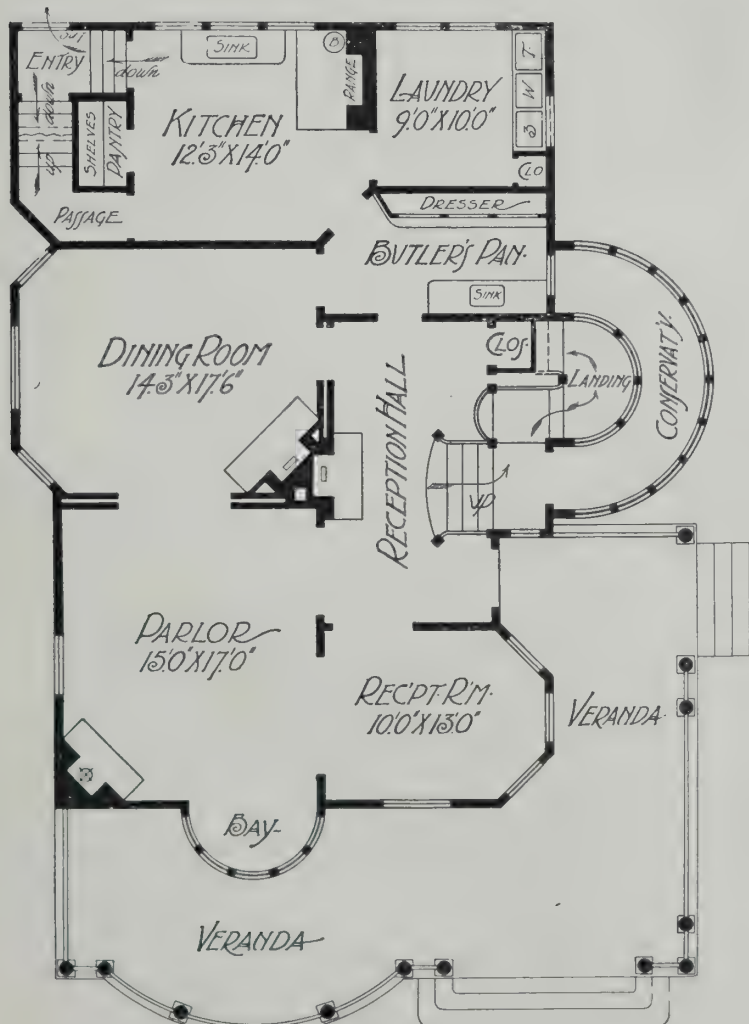
usual fixtures, and store closet. Laundry in extension has three tubs and sash door to rear porch. Last named rooms finished in white pine. Hall finished in quartered oak, natural, has wide staircase of easy rise, with ornamental newel and turned balusters, and is lighted by leaded glass window of pleasing design. Reception room of good size, in cherry, has angle fireplace and mantel of neat design. Staircase hall on second floor, plan shows triple window, glazed with leaded cathedral glass. There are four chambers, with generous closet accommodation, sewing room with angle fireplace, linen closet, two servants' and bath rooms, with fixtures of best make. Attic has billiard room, 18 ft. 6 in. x 20 ft., and two bedrooms finished off. Store room and attic space left unfinished. Cellar, cemented, has cold room with hanging shelf. Servants' W. C., brick set furnace, fuel storage and bicycle room. Plans prepared by J. G. Richardson, Esq., J. C. Sawkins, Esq., builder, both of Flatbush, L. I. Cost complete, \$11,000.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

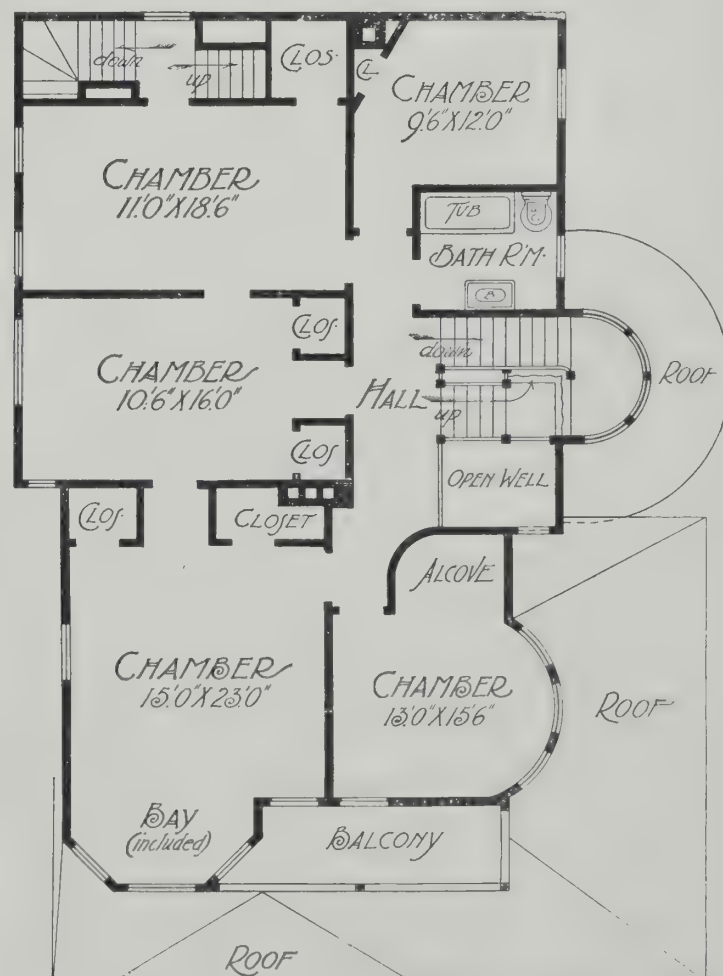


A HALF-TIMBERED COTTAGE, GLEN RIDGE, N. J.—See page 38.





FIRST FLOOR PLAN.



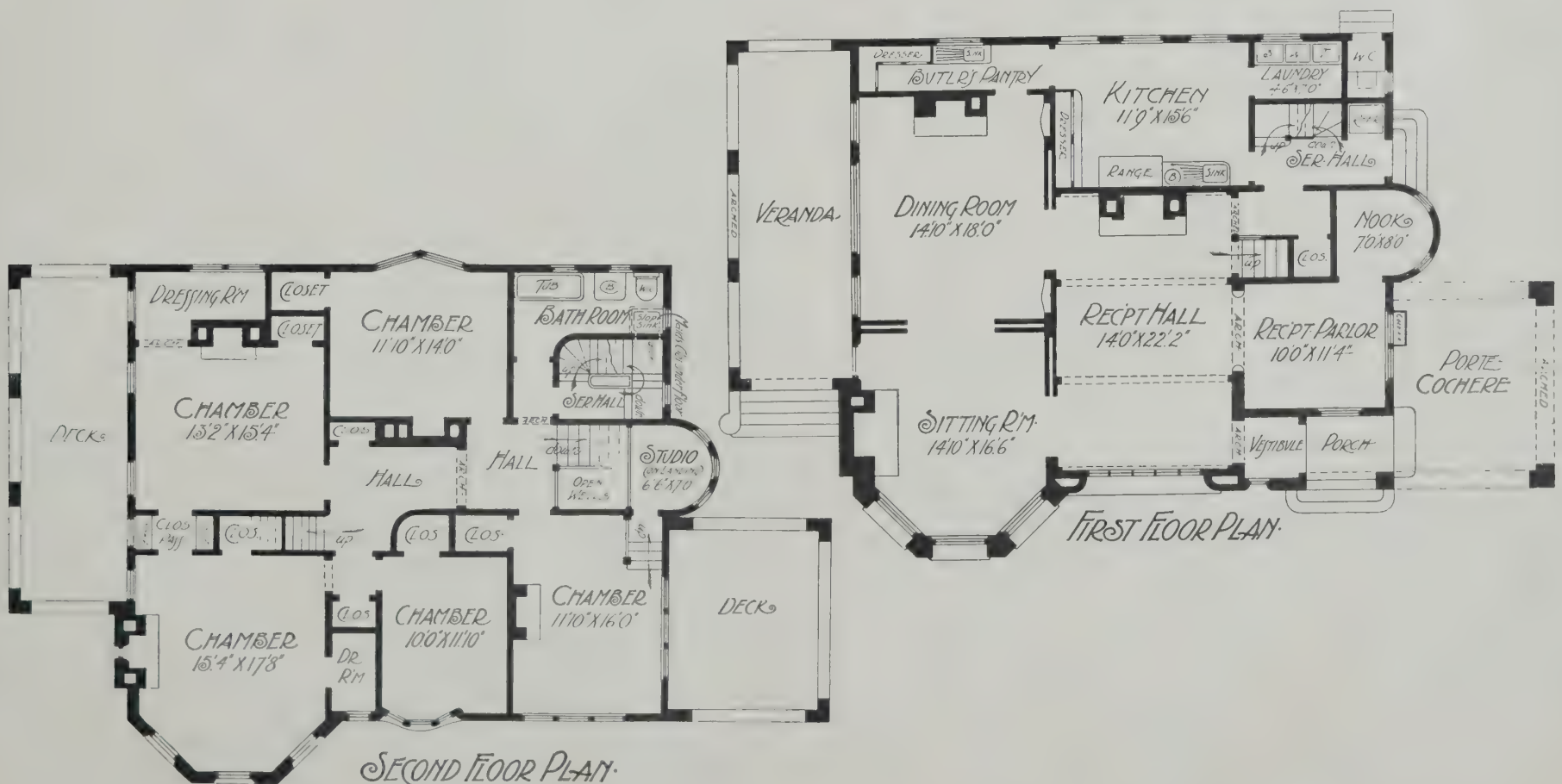
SECOND FLOOR PLAN.





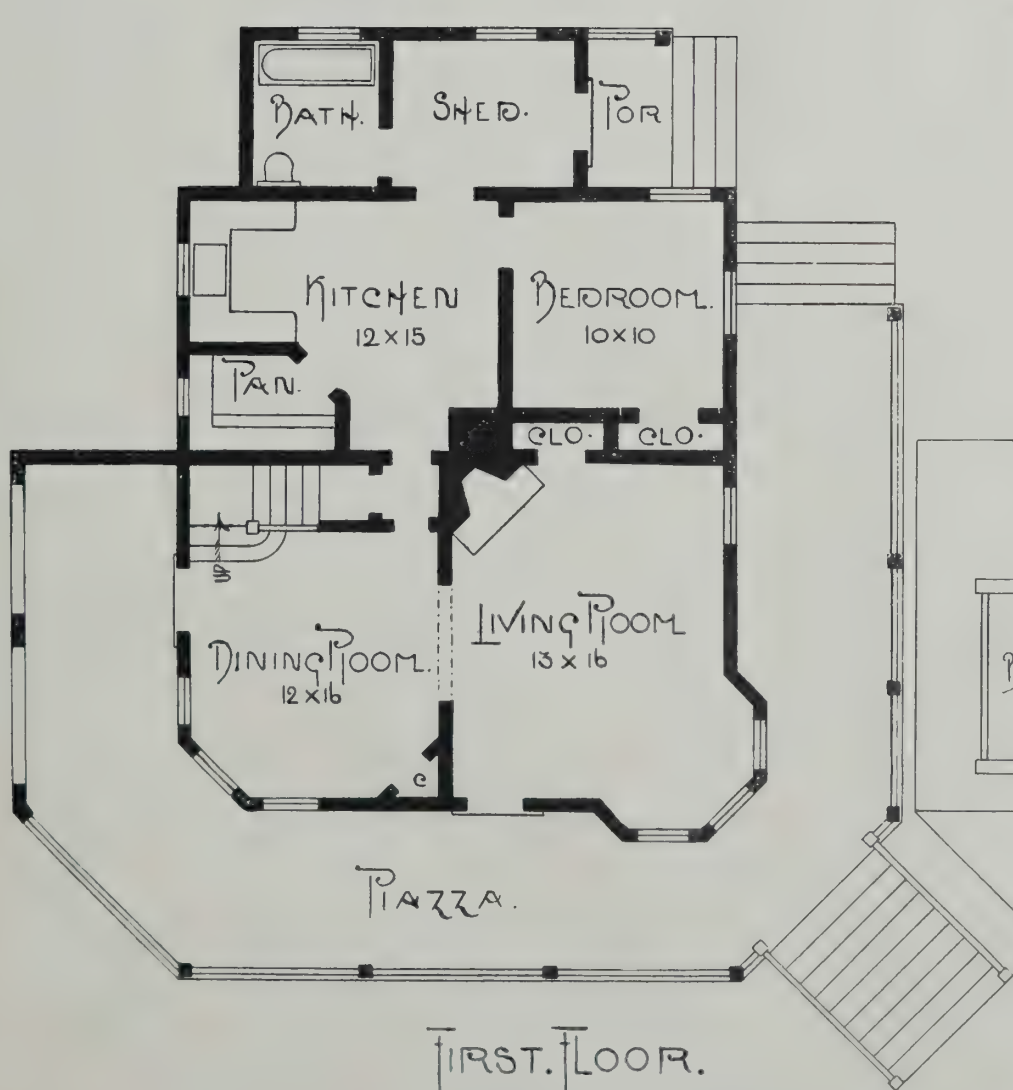
A HOUSE AT ELIZABETH, N. J.—See page 39.



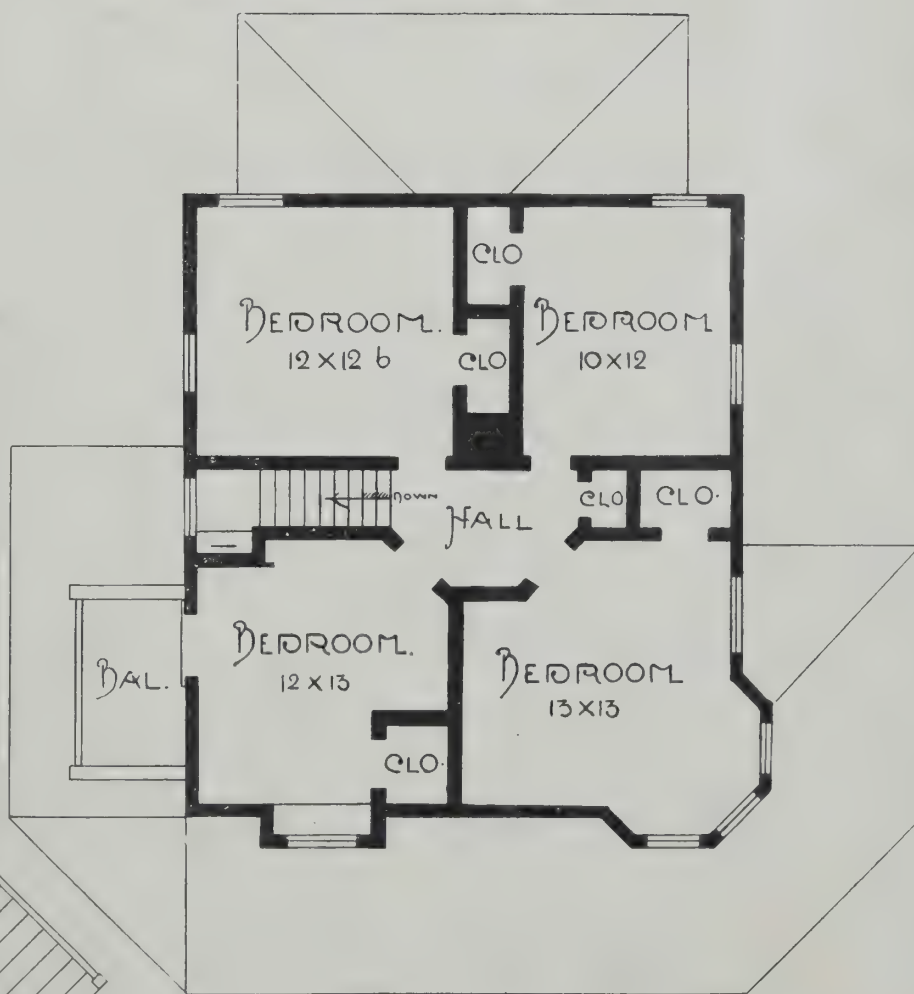


A RESIDENCE AT MONTCLAIR, N. J.—See page 39.





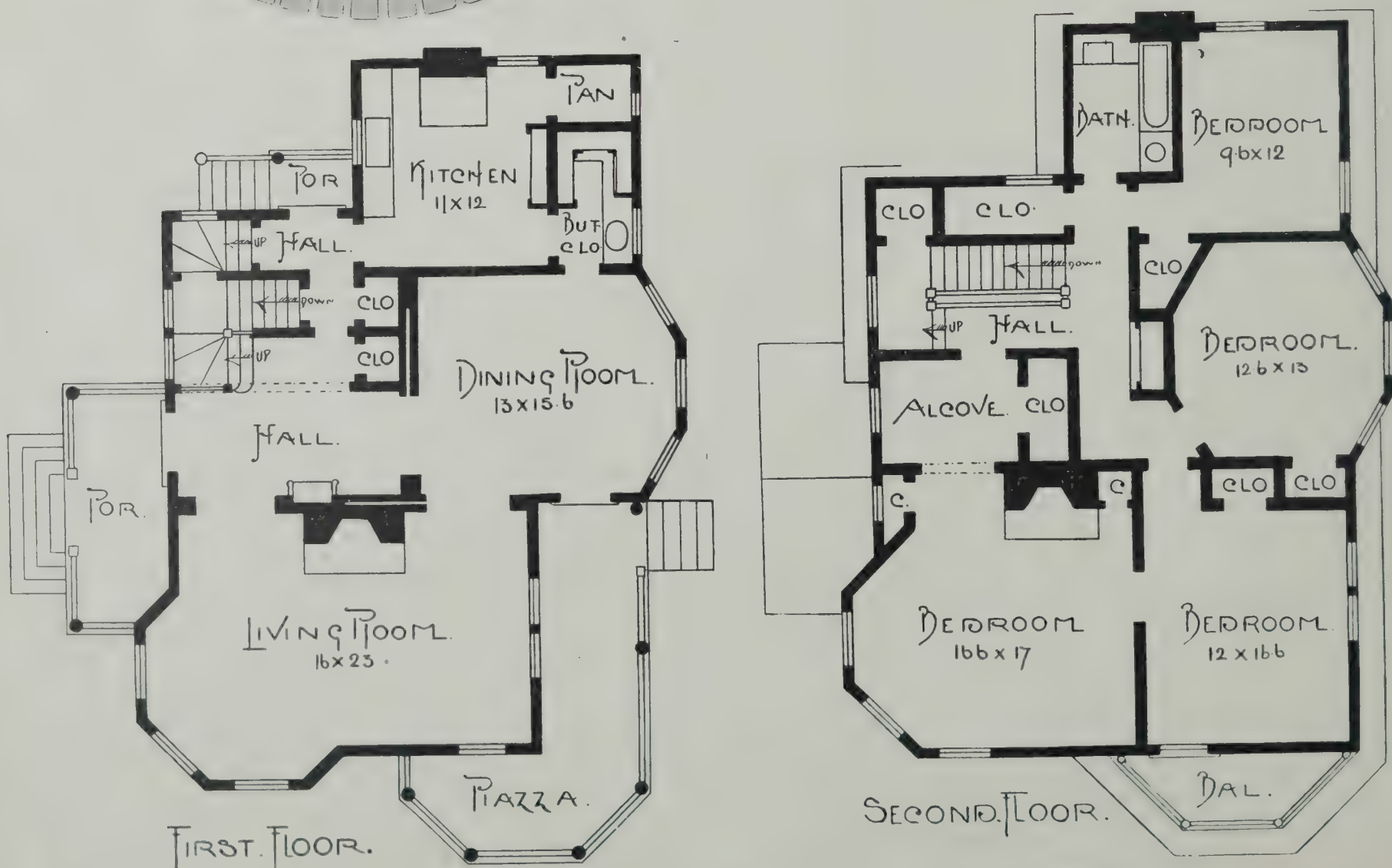
FIRST FLOOR.



SECOND FLOOR.

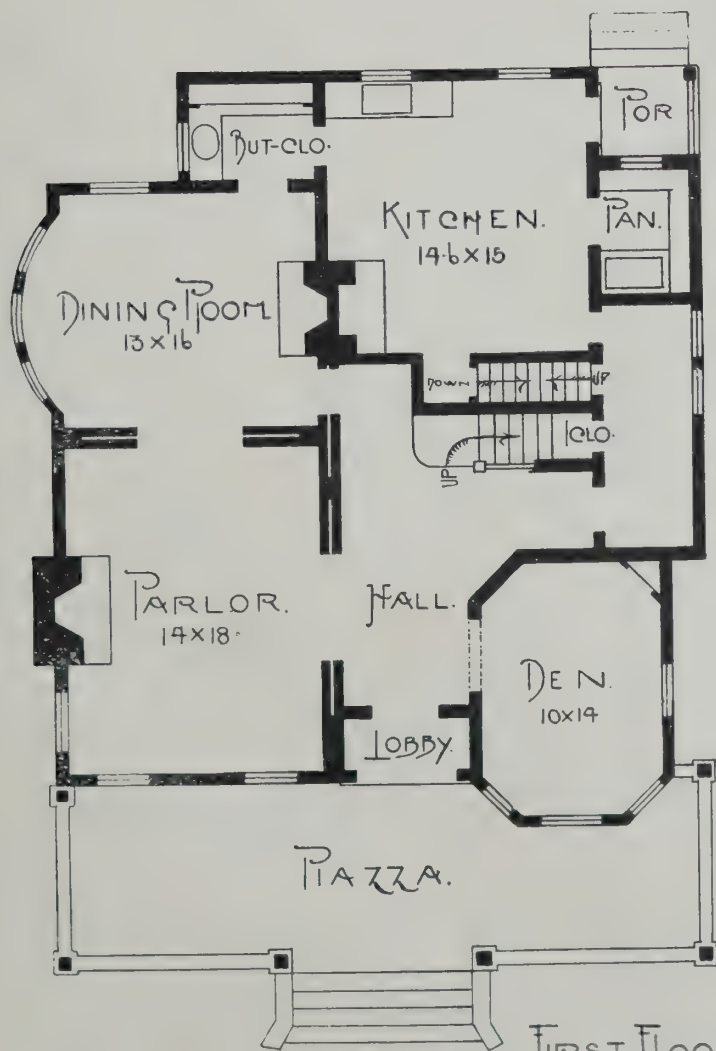
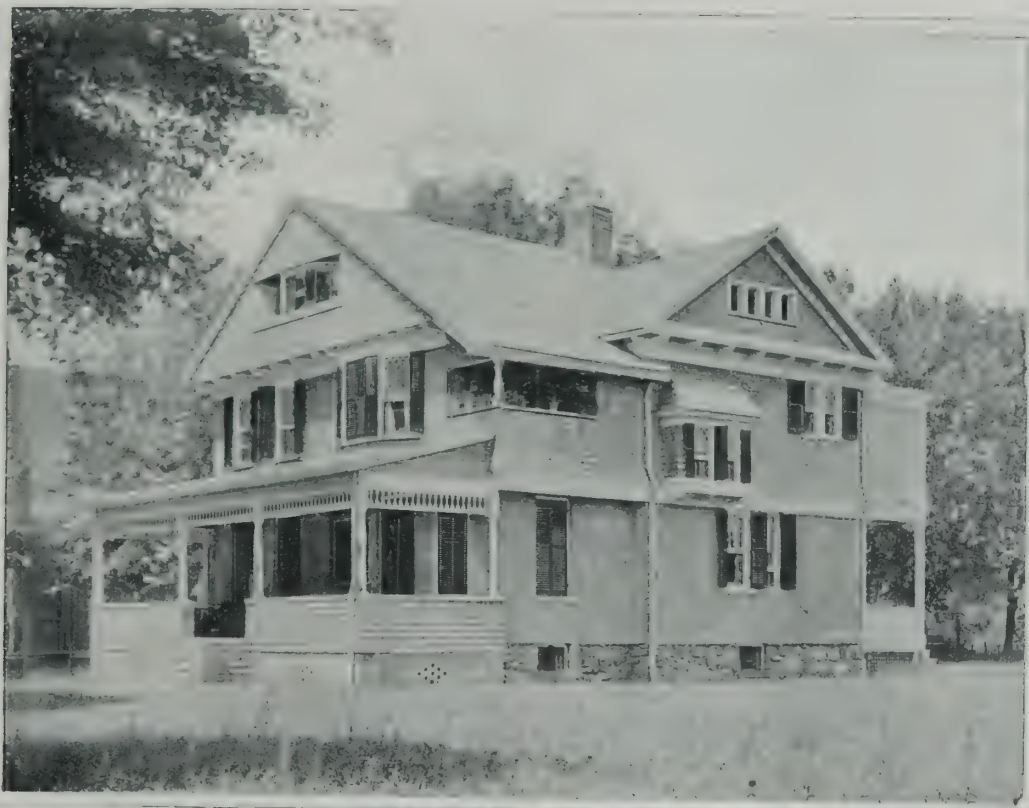
A COTTAGE AT GREAT DIAMOND ISLAND, MAINE—See page 38.



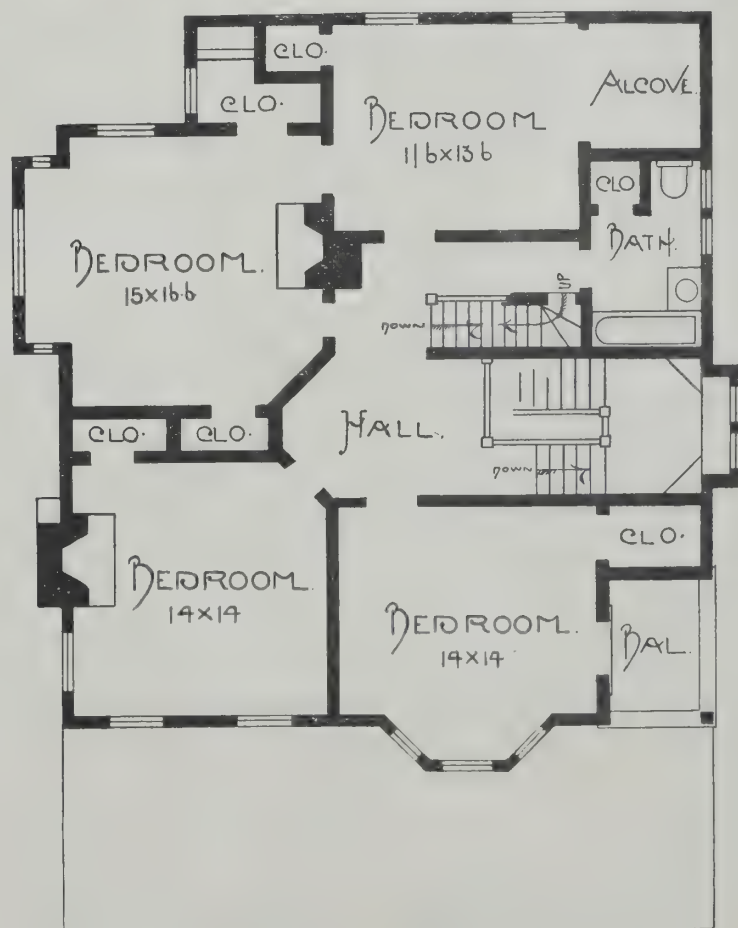


A COLONIAL DWELLING AT ARMOUR VILLA PARK, NEW YORK.—See page 38.



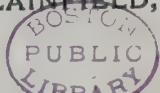


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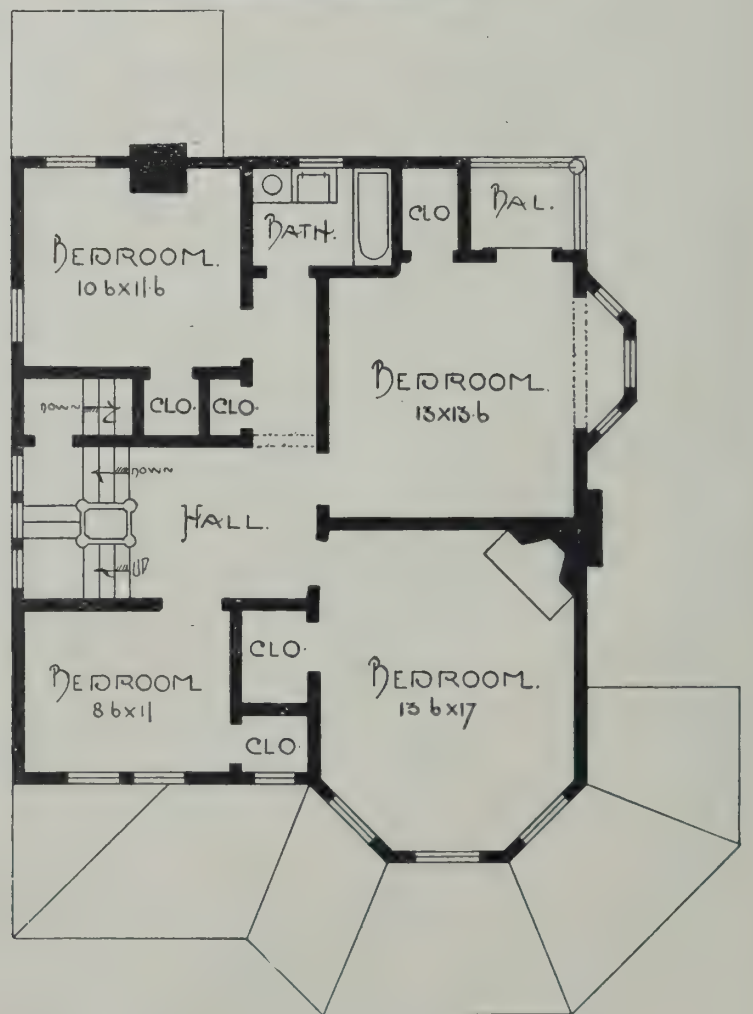
SECOND FLOOR.

A COTTAGE AT PLAINFIELD, N. J.—See page 49.





FIRST FLOOR.



SECOND FLOOR.





THE BANK FOR SAVINGS, NEW YORK.

THE BANK FOR SAVINGS.

We present above an engraving showing the new building of "The Bank for Savings," which has been recently completed on the southwest corner of Fourth Avenue and Twenty-second Street, New York City.

It might be well to state that this bank was the first savings institution incorporated in the city of New York, and was formerly known as the old Bleecker Street Savings Bank. The property fronts one hundred feet on Fourth Avenue and one hundred and thirty-two feet on Twenty-second Street. The building as now completed is one of the most picturesque, best appointed, and much admired of its class in the vicinity of New York.

Merritt Trimble, Esq., its president, is given much credit for his care and skill, and for his efforts in materializing this fine building, which is an ornament to the surrounding property.

The aim of the architect has evidently been to show by constructional outlines the general character of the building, to avoid all unnecessary ornamentation, and to have the design show upon its face the purpose for which the building was intended. The perspective shows an appropriate and quiet style of architecture, with classic proportions and Romanesque detail, and which is said to be more elegant than elaborate.

The exterior of the building to the top of water table is built of Milford granite. The joints are cut back, and a rough, comparatively even surface forms the foundation for the main building. The superstructure above is built of Tuckahoe marble. This marble is well rubbed, bringing out the fine tones of the natural white—from a bluish to a reddish tint in fine shades, producing a most pleasing effect in contrast with the usual dead white of a marble building. The dividing line between the upper and lower windows is heavily ornamented with carved work, carried around both fronts, and giving emphasis to the size of the building. The spandrels over upper windows are carved in an elaborate manner, and there are flanked on either side of opening a cluster of columns with carved capitals. The doorways have similar columns and bronze doors.

The corner of the building over exit and entrance, and also over the bond and mortgage room, is recessed 16 ft., thus throwing the large windows of this recess into the main banking room; the effect of this is the picturesque grouping of the upper part of the building and the formation of an easy and pleasing skylight. The whole building is surmounted by a massive cornice.

The main offices of the bank, consisting of the president's room, bond and mortgage room, copyists' and comptroller's rooms, etc., take in what might be called the first

story of the street front, leaving a main banking room 75 ft. square by 60 ft. in height. The former are trimmed with mahogany and oak. The open fireplaces are furnished with tiled hearths and facings and massive carved mantels. The banking room is lighted by arched windows, which open direct into room, and by the dome in ceiling. A high Nubian marble wainscot, which is exquisite in tone, extends around the banking room, 20 ft. in height. The banking inclosure is also constructed of the same marble, surmounted by a rich grillework and statuary bronze. Every attention has been paid to the facilities for the dispatch of business.

The ceiling is heavily beamed with ornamental iron girders, forming deep panels, which are subdivided into smaller panels; the centre of which is raised 15 ft., and finished off into a dome. The floors throughout are paved with fine marble mosaic, with a rich border.

The annex contains the trustees' room, locker room and toilets, while the second floor contains janitor's apartments and dining-room for the bank officials. The toilet rooms are paved and wainscoted with Italian marble, and are furnished complete with exposed plumbing. Mr. Cyrus L. W. Eidlitz, architect, 160 Fifth Avenue, New York.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT PLAINFIELD, N. J.

On page 47 we present a residence which has been erected for Charles H. Lyman, Esq., at Plainfield, N. J. The engraving presents a quaint and picturesque dwelling house, while the plans show a most unique and convenient interior arrangement. The underpinning is built of "rock-faced" field stone, laid up at random. The first story is built of well-burned red brick, and is covered with cement plaster, dabbled, and brush finished. The second and third stories are shingled and left to weather finish; the trimmings are painted white. The roof is shingled also and treated similar. Dimensions: Front, 38 ft.; side, 41 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft., first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. Hall and den are trimmed with oak. The former contains a lobby and an ornamental staircase with carved newel posts. A bay window is thrown out at second story landing, with seats and latticed window. The parlor is treated in white and gold, and it has an open fireplace, built of brick, with tiled trimmings, and a colonial mantel with mirror and columns. The dining-room is trimmed with oak. It has a wainscoting and a fireplace built of Tiffany brick, with facings and hearth of same, and a massive oak mantel. The floors are laid with oak and are highly polished. The kitchen is wain-

scoted and trimmed with yellow pine, finished natural, and it is provided with fireplace for range, store pantry, with ice-box built in, butler's closet, and stairs to cellar and to second and third floors. There are four bedrooms, six closets and bathroom on second floor, and ten bedrooms and storage on third floor. Bathroom is wainscoted with white enameled tiling, and is furnished with the usual fixtures, with exposed plumbing. Cemented cellar contains furnace, laundry and other necessary apartments. Cost, \$5,000 complete. Mr. W. H. Clum, architect, Plainfield, N. J.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

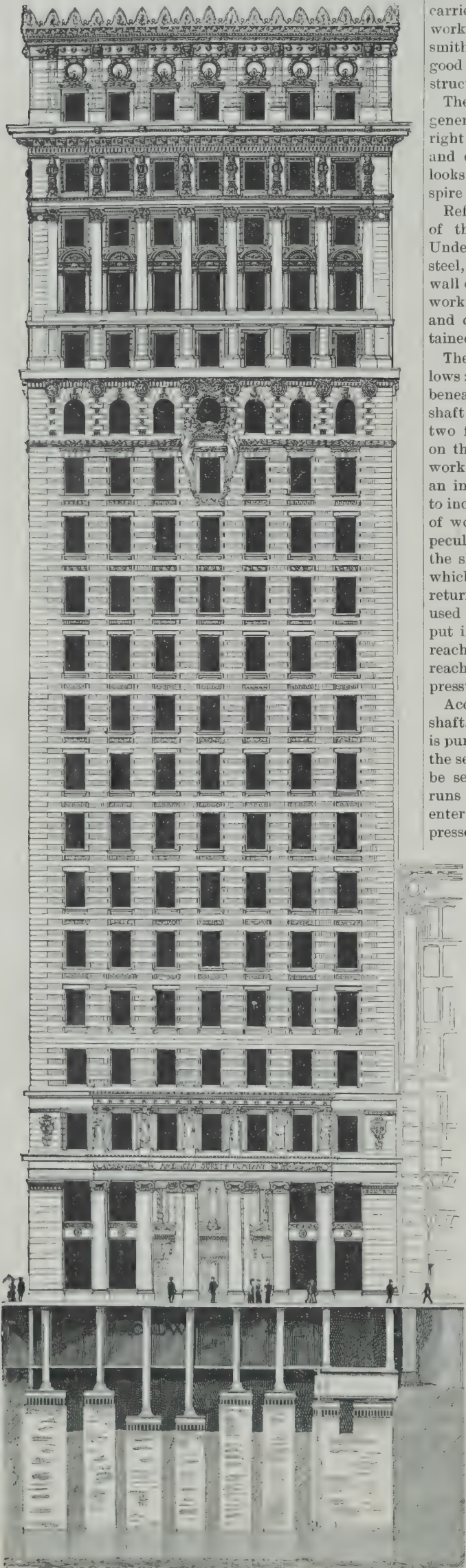
HOUSE AT SCRANTON, PA.

The subject of illustration on page 44 is the residence of D. E. Taylor, Esq., at Scranton, Pa. The design is very effectively treated, having an arched entrance porch and veranda, roofed with gable above, circular tower as corner feature, roof lines well broken, and bays worked in. Underpinning, first story, etc., of Warwick limestone, gray in color, laid with joints well broken. Structure above is sheathed, papered, clapboarded, and painted yellow; roof shingled and stained red. Dimensions: Front, 49 ft. 7 in.; side, 55 ft. 4 in. Heights: Cellar, 8 ft. 6 in.; first story, 10 ft.; second, 9 ft. 6 in.; attic, 8 ft. The plans show a convenient arrangement of rooms. Entrance hall is reached through vestibule, and connects with parlor and library through sliding doors. There is an arched opening to main hall, with angle fireplace and closet; broad staircase, having ornamental newel, turned balusters, and seat at side, all finished in quartered oak. Den, having angle fireplace and bay, has an arched opening to nook formed by circular bay, which is means of communication through arched opening to library. The dining-room is of pleasing proportions, with break for buffet and china closet at side; connects with kitchen, having usual fixtures, through butler's pantry, with dresser, etc. Store-room of good size, and well provided with shelving. Second floor plan shows a central hall with open well, all in quartered oak, same as below. Six chambers, with very generous closet accommodation, dressing-room, and bath with usual fixtures of best make, plumbing being exposed. As various woods have been used in trimming the rooms, the finish is mentioned on plan. Attic has three rooms, with closets and trunk room. Cellar, cemented, contains laundry, heating apparatus, fuel bins, etc. Cost of house complete, \$15,000. E. G. W. Dietrich, Esq., architect, 18 Broadway, New York city.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

STEEL FOUNDATIONS FOR LARGE BUILDINGS.

The contour of the city of New York is undergoing a very striking change in the increasing number of tall office buildings now being erected. The construction of these buildings is made possible only by the use of steel frames. The older type of building, whether of brick, of stone, or of iron, depended for its strength upon its walls. The modern tall office building has a steel frame. This carries nearly the whole weight, and the walls, solid and massive as they appear, do not support the structure, but simply fill the interstices. It is startling to think of the entire superstructure of a twenty-story building resting upon thirty or forty columns. Yet without this modern development, without the use of steel, the walls



THE AMERICAN SURETY BUILDING.

of these buildings would have to be so thick at the lower story that there would be no room left for offices.

We propose to illustrate the foundation of the American Surety Company Building, at the corner of Broadway and Pine street, designed by Mr. Bruce Price, the well-known architect of this city. The building is 303 feet high from the street to the cornice line, having twenty stories. It covers a lot approximately a square, 85 feet 4 inches by 84 feet 8 inches in area, yet none of whose sides is quite parallel. The general design of the tower-like structure speaks for itself, though much of the detail is very rich, and cannot be shown in a cut on so small a scale.

We will first describe the method adopted in the sinking and construction of the piers, which had to be carried down to an unusual depth. This part of the work was conducted by the engineering firm of Sooy-smith & Co., of this city. Our illustration will give a good idea of the most advanced methods of caisson construction for city buildings.

The weight is carried on thirteen brick piers, the general plan of which can be seen in our cut. To the right is Broadway, with its stream of pedestrians, wagons and cable cars, while old Trinity, on the opposite side, looks down on this new building, which surpasses its spire in height.

Referring again to the cut of the foundation, the tops of the piers are seen carried up to their final level. Under each pier is a rectangular caisson of half inch steel, seven feet in internal height, and with its outside wall carried up two feet farther. From the caisson top a working shaft of steel, three by five feet in area rises, and on top of this air shaft is placed the air lock, contained in a cylinder, six feet in diameter and ten feet high.

The process of sinking the foundation wall is as follows: The caisson is established in place, and the ground beneath is dug out and drawn up through the working shaft in buckets. Concrete is laid on top to the depth of two feet within the upward extension of its walls, and on this brickwork is laid. As fast as it sinks the brickwork is built over it, so that it is continually subjected to an increasing pressure. Pig iron is sometimes piled on to increase the weight. As it goes down, a new section of working shaft has from time to time to be added. A peculiar form of coupling is used for the joint between the shaft sections, illustrated in one of the small cuts, which will be found self-explanatory. By the use of the return flange seen on the upper section, tap bolts can be used for fastening the sections together, which bolts are put in place from the inside of the shaft. Until water is reached, all is clear sailing, but as soon as the caisson reaches water, which it does about twenty feet down, air pressure has to be applied.

Accordingly, the air lock is fastened to the top of the shaft, and thenceforward for the rest of the descent air is pumped in under pressure. Looking at the drawing of the section of the air lock proper, on its right hand will be seen two doors opening downward, while a ladder runs down its side. Through these doors the workmen enter. For entrance the lower door is closed, the compressed air is allowed to escape, and the upper door is opened. The person entering goes into the small chamber, the upper door is closed, compressed air is gradually admitted, and when the full pressure is reached the lower door is opened, and the way is open for descent to the caisson beneath. To the left of the division of the air lock just described is a special section devoted to the extraction of material. This is really a separate air lock, complete in itself. Its lower end is closed by a door opening downward, similar to those already described, while its upper end is closed by two heavy doors sliding horizontally, fitting air-tight as near as can be, with rubber packing, and operated by pneumatic pistons and cylinders. These constitute the bucket gate, and are illustrated in detail in the sectional drawing in the right lower corner of the cut.

There are two heavy sliding doors, air-cushioned as they open, and worked by the two pneumatic cylinders as shown. Where they join in the centre is an opening, which grips a cable tube provided with a stuffing box such as is used on a steam cylinder, through which stuffing box a hoisting cable works. The operation of drawing out a bucket of earth is as follows: The bucket, being filled by the men in the caisson, is drawn up, while the upper sliding doors are closed, and the lower door is opened. The rope, working smoothly through the tightly packed stuffing box, draws the bucket up into its section of the air lock, hardly any air escaping. The lower door is then closed, the sliding doors are opened, and the bucket is drawn out into the open air, and emptied. As it rises, the doors being opened, the tube carrying the stuffing box goes with the rope. When lowered, the tube is brought back into its proper place between the sliding doors. As they are closed, gripping the tube, the air is readmitted to the section, the lower door is dropped, and the bucket descends. The air lock which we have just described is of the Moran

patent, Mr. D. C. Moran being in charge of the operations on the ground.

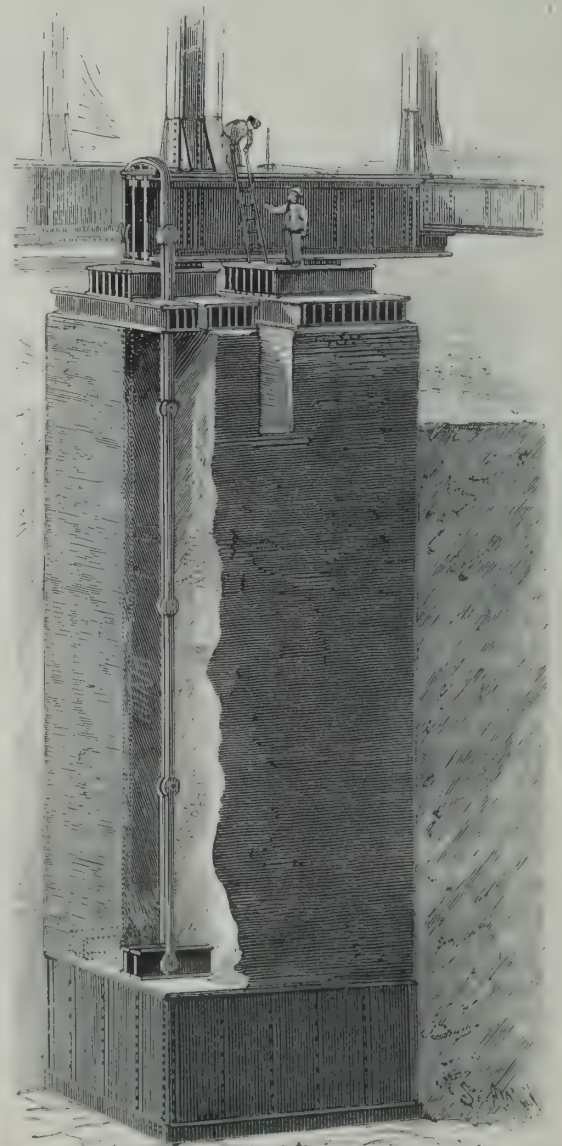
The caissons are carried down 70 feet from the street level to the bedrock. Each one, after reaching its position and being established on an excavated bed in the stone, is filled with concrete. As much as 52 feet of



AMERICAN SURETY COMPANY BUILDING.

descent was accomplished in one week on one of the piers. The general disposition of the piers and their size are regulated by the consideration that no greater strain than fifteen tons per square foot shall be imposed upon them by the weight of the superstructure. By beams and cantilevers the weight of the building is made to come as nearly as possible over the centre of the piers.

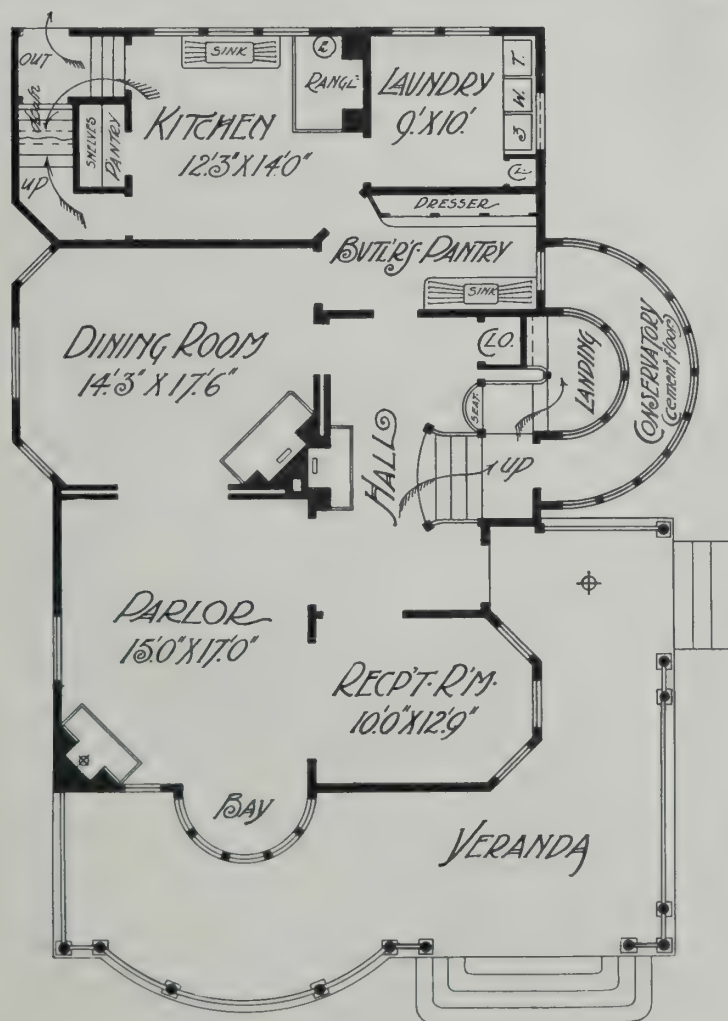
We will now describe the mode of distributing the weight of the building upon the piers. Referring to the large engraving of the front elevation of the building, at the base are shown the different piers sunk by the pneumatic method, which will be described further on. The bearing of the columns has to be distributed over the tops of the piers. A steel plate covers the top of the masonry. On this is placed a grillage, whose first course is made of



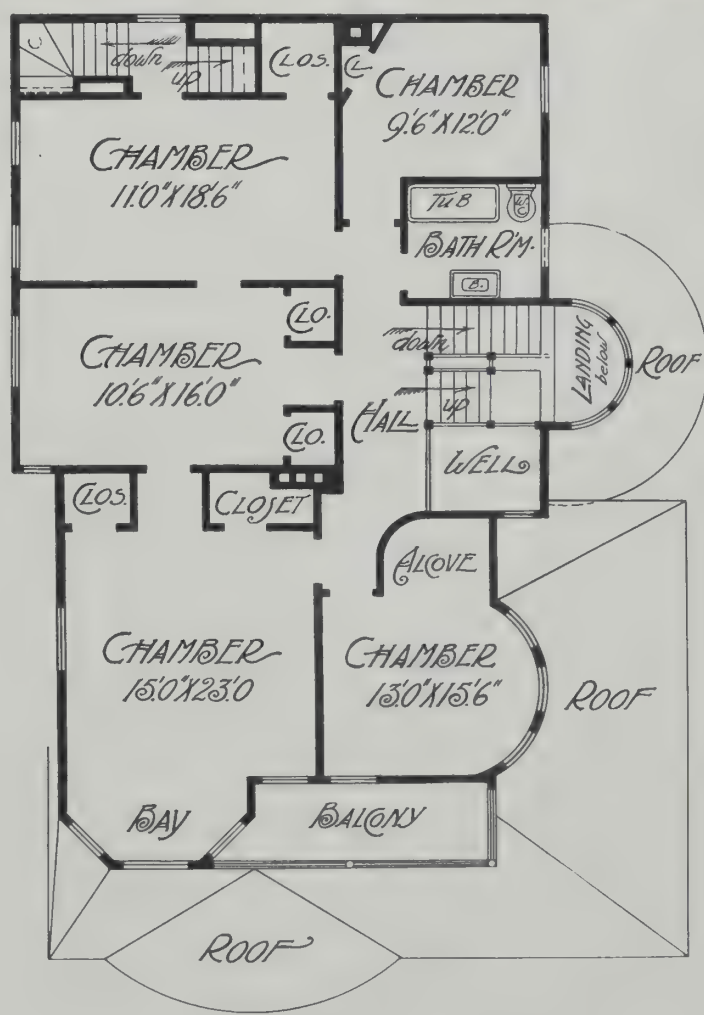
DETAILS OF CANTILEVER, AMERICAN SURETY BUILDING.

ten 24-inch I-beams, weighing 80 pounds to the foot. These beams are just long enough to extend across the top of the pier, which is covered by them laid close together. Transversely to these, five 20-inch I-beams, weighing 64 pounds to the foot, are laid, covering about one-half of the area, only in the centre. A course of steel billets,

(Continued on page 52.)



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

STEEL FOUNDATIONS FOR LARGE BUILDINGS.

(Continued from page 50.)

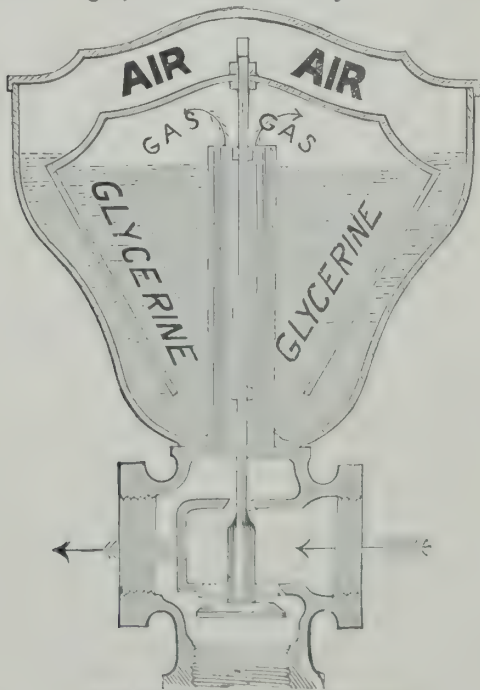
4 inches square each, rests on these beams, and on this third course of the grillage the base of the column is placed.

This description applies to the direct bearing columns. As the building is erected, no party walls are employed; the foundation was restricted to the limits of the lot where bounded by other houses. It is evident that a direct bearing column for some portions of the side wall would have rested dangerously near the edge of the foundation piers. To provide for this difficulty, cantilevers were employed to shift the bearing of the outside column back to the centre of the pier. Referring to the large cut, one of such cantilevers is shown on its right hand, and the same is shown on a larger scale in the detail cut. On precisely such grillages as already described, a very deep plate girder is established, which rests on two sets of steel billets, each set placed approximately over the centre of a pier top. The inner end of the cantilever is held down by massive iron straps. Its outer end projects for several feet beyond the steel billets, and on its outer extremity is placed the column of the outer wall. As the building progresses, the tie just described holds the inward end of the cantilever down in its place. On the same inner end is established another column, which in the completed building supports such a share of the weight as to take the strain from the anchorage. It seems a daring conception to base the wall of a 300 foot building upon an end of a plate girder overhanging as this one does, yet precisely this method of construction is adopted in many buildings, and is recognized as one of the best ways of solving the problem of their construction.

The American Surety building rests on thirty-two of these steel columns. Two of them bear a weight of 584 tons each; one of the columns on the north side carries 1,280 tons; these are the extremes of weights carried; the other twenty-nine columns sustain various loads intermediate between these. There are two cantilever columns, and they support respectively 746 and 663 tons. The columns support all of the building except these lower two stories.

AN AUTOMATIC GAS SAVING GOVERNOR.

Whenever gas bills are deemed excessive, there is a strong presumption of great variability in the pressure of gas, which may vary in ordinary city use from over three inches water pressure to less than an inch. The high pressure, however, though causing a great increase in the flow of gas through the pipes, does not give any additional light, but almost always diminishes the



THE SLEEMAN GAS GOVERNOR.

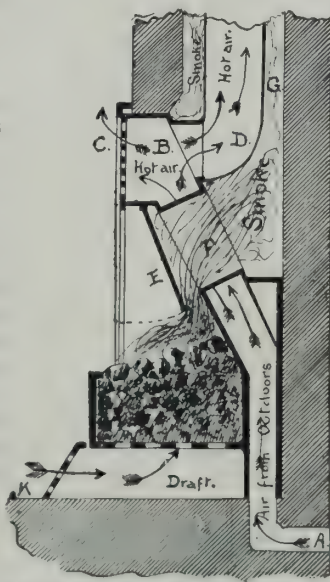
luminosity, it being a well established fact that the best illumination is obtained from a gas burner when the pressure in the pipes is from five to six tenths of an inch. A governor, which will effectually and automatically limit the pressure to this most desirable mean, whether one burner is used or a hundred burners, at different times, is shown in the accompanying illustration. It is

not a new device, having been many years before the public, and having obtained a wide popularity, while receiving the unqualified indorsement of the highest scientific authorities. It is manufactured by N. Sleeman, 775 Chapel street, New Haven, Conn., whose New York office is at No. 140 Nassau Street; the machine being simple, strong, and not liable to be affected by impurities in the gas, and the street pressure being cut off automatically when the lights are extinguished, preventing all wastage and poisonous odors from leaky pipes.

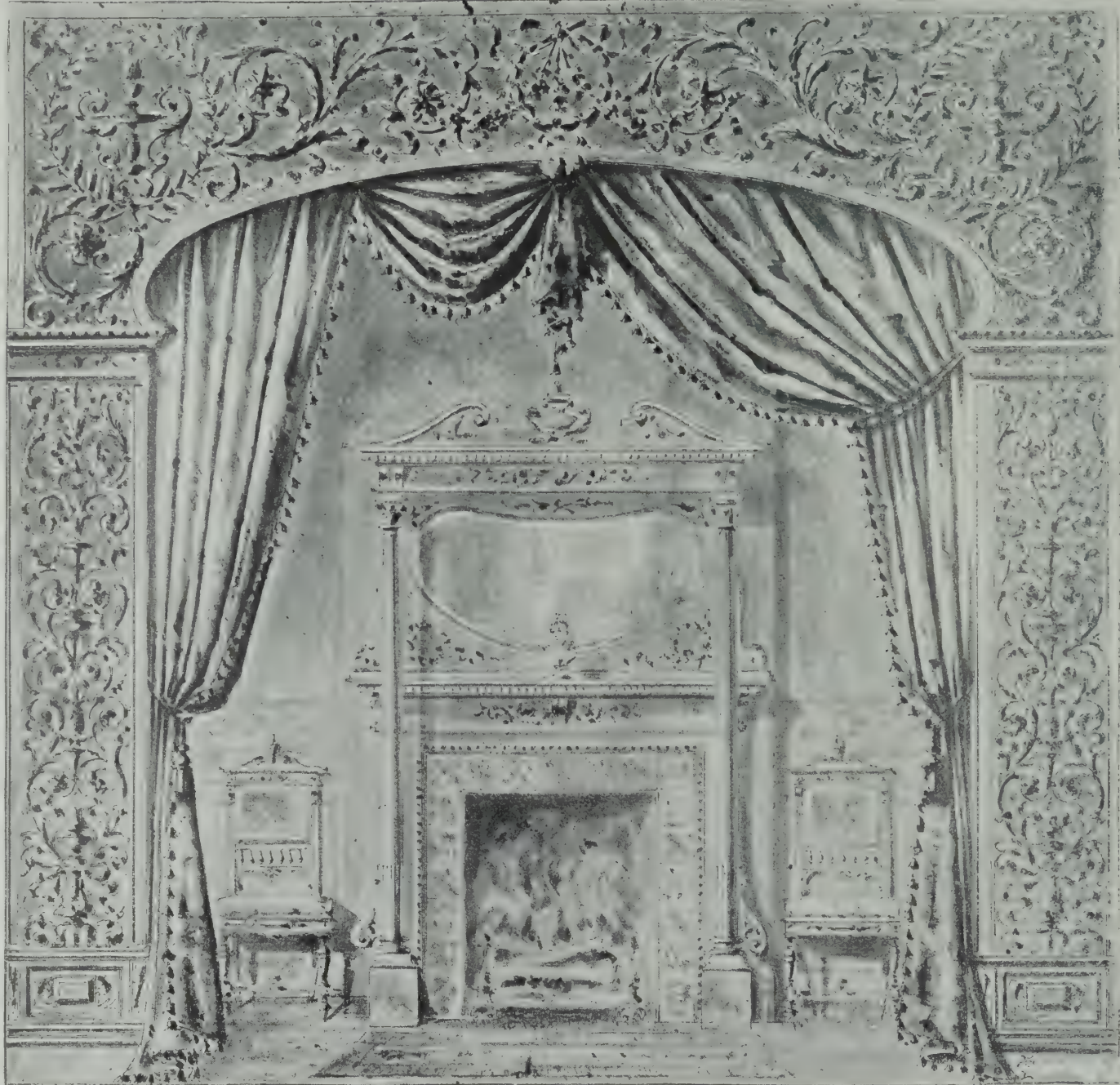
HEATING A RESIDENCE WITH OPEN GRATES.

Except in the South, where the thermometer seldom goes below the freezing mark, open fires are used mainly for cheer and ventilation. To attempt to heat with them is usually considered not only wasteful of fuel, but unsatisfactory in results. The furnace, steam or hot water heater is, therefore, used in the best residences, and stoves are used in the houses of the poorer people, and the healthful effects of the open fire are lost.

It is with considerable interest, therefore, that the success of a new system has been watched during the past year. This system consists in heating with "ventilating grates," of which one of the illustrations shows the front view. It is an ordinary open grate, with a big, open basket, in which wood, coal or gas can be burned. In this respect, it is the same as the old-fashioned grate. In the back, however, as shown in the side view, is a heat-saving chamber, connected below with a cold air box, and above with a register over the front of grate. Air entering at A is heated in its course over the heated iron back of the grate, entering the room at C, or passing through the hot air pipe, D, heats rooms on the floor above. Each grate will heat 7,000 cu. ft. of space in zero weather, which means three rooms, 15 x 15 x 10.

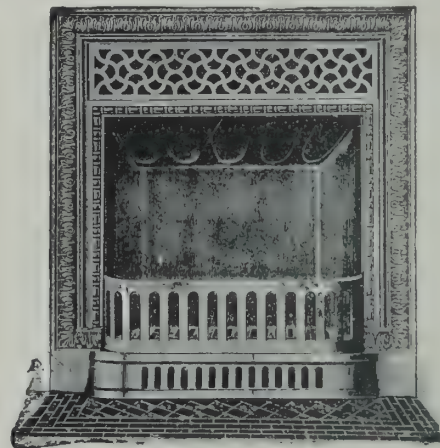


THE JACKSON VENTILATING GRATE—SIDE VIEW.



NEW DESIGN FOR A SCREEN BETWEEN ROOMS.

It is practically applying the principle of the furnace to the open fire, and a great advantage is realized in that there is not the loss of heat in the cellar, as in the case of the furnace. No special fireplace construction is necessary, and as the first cost is less than that of a good furnace, these grates are well adapted to use in small



THE JACKSON VENTILATING GRATE—FRONT VIEW.

residences, as entire heating apparatus, or for spring and fall use in larger houses.

Further information can be had from the manufacturers, Edwin A. Jackson & Bro., 50 Beekman Street, New York, who will forward catalogue if desired.

ARRANGING EFFECTIVE INTERIORS.

The illustration represents a new design by Messrs. Hall & Garrison, of Philadelphia, for a screen, or ornamental curtain sustaining framework, manufactured by means of the employment of their recently introduced material, Dec-co-re-o. The method of manufacture is as follows: A number of pieces of material are glued together, cross-grained, making a thin, strong board, not liable to warp, on which is applied the composition ornament in relief. The work produced is said to be as fine as hand carving, less expensive, and just as durable. It may be finished in any color of wood or paint, bronze, brass, or old iron, and in different finishes of gold and white and gold. It can be applied in stairways, grilles, screens, transoms, wall and ceiling decorations, and for an almost illimitable range of interior ornamentation. Architects, builders and decorators should send for an elegantly illustrated, descriptive catalogue to the above firm, at 1140 Washington Avenue, Philadelphia, Pa.

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No. 4.



A DWELLING AT GLEN RIDGE, N. J.—See page 54.

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A. E. BEACH.

NEW YORK, APRIL, 1895.

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SCIENTIFIC AMERICAN, BUILDING EDITION.

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A DWELLING AT GLEN RIDGE, N. J.

The subject of our color illustration this month is a Colonial cottage, recently completed for Frank L. Purdy, Esq., at Glen Ridge, N. J. On page 53 we present another view, and plans on page 55. The design is in perfect harmony with the surroundings, being broadly treated, with hipped roof width, projecting over porches and supported by heavy Tuscan columns; dormer windows of original design, and generous overhangs, are its principal exterior features. Dimensions: Front, 47 ft.; side, 52 ft. 6 in., inclusive of all projections. Heights: Cellar, 7 ft.; first story, 8 ft.; second, 8 ft.; attic, 7 ft.; 9 in. Underpinning of rubble stone; all exterior framework above sheathed, papered, shingled, and left to weather. Trimming color, cream white. The plans show a convenient arrangement of rooms. Vestibule finished in yellow pine, with side seats, wide Dutch entrance doors, with two large panels, and lights at side, divided by wooden muntons. Central reception hall, with wide stairway, having newel formed by spindle balusters, all in maple; rail being mahogany; the nook is a cheerful feature, with circular arch, raised floor of brick, laid herring bone, and fireplace; seat has hinged top. The walls are of plaster, sand finish, flesh tint. Parlor of good size, has angle fireplace of Pompeian brick, with mantel above, supported by Tuscan columns; the walls are tinted pale yellow, frieze a trifle deeper, ceiling gray; finish, cream. Dining-room also opening into hall, with 7 ft. sliding doors, has 6 ft. paneled wainscot, three panels in height, stained pistachio green; plaster, frieze and ceiling in same color; fireplace of mottled brick, with mantel above, also brick hearth; angle china closets, with leaded glass doors of original design. Kitchen complete with usual fixtures, connects through butler's pantry, fitted with dresser and sink. Second floor, finished in whitewood, is divided into four chambers, with ample closet room and bath, having enameled tub, marble basin, etc., all plumbing being nickelplated, exposed, and of best make. Double floors throughout, hardwood in principal room. Attic has a servant's room finished off, store and attic space unfinished. Cellar cemented, has heating apparatus, fuel, storage, and provision room, with shelves. Any further information desired may be obtained of the architect, Charles P. Baldwin, Esq., Prudential Building, Newark, N. J.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A RESIDENCE AT HOLYOKE, MASS.

On pages 58 and 59 we present a residence recently completed for George N. Tyner, Esq., at Holyoke, Mass. The design is treated in the Romanesque style of architecture. The building is constructed in a thorough, substantial manner. The balustrade at piazza and first story are built of quarry-faced red sandstone, with dressed sandstone trimmings. The second story is beamed and paneled. The cornice and gables are carved in a handsome manner. The roof is covered with red slate and copper. Dimensions: Front, 69 ft.; side, 56 ft. 8 in., not including piazza and porte-cochère. Height of ceilings: Cellar, 8 ft.; first story, 11 ft.; second, 10 ft.; third, 9 ft. Vestibule has a paneled wall and ceiling, and floor laid in tiles. The main hall is trimmed with quartered oak. It is treated in the Romanesque style. The ceiling is of oak, heavily beamed and ribbed, forming deep panels. It has also a paneled wainscoting, with the walls above covered with embossed leather, carved casings and cornice. The staircase is a broad, low one, with a massive carved newel post extending to ceiling, and it is lighted effectively by a cluster of stained glass windows at first landing. The fireplace is built of brick, with facing of red marble, with wrought iron trimmings, and a mantel elegantly carved, with paneled divans on either side. Drawing-room is treated in the Renaissance style. It has rare bits of carving at random, and the whole trimmings are finished in ivory white and gold. The fireplace has facings and hearth of Mexican onyx, and mantel with beveled plate glass mirror. Parlor is treated in the Colonial style, and it is trimmed with cherry, and it is also furnished with a fireplace with tiled trimmings and mantel (carved), with mirrors and columns. Billiard-room is trimmed with sycamore. It is provided with a paneled wainscoting, ceiling beams, and fireplace furnished similar to the one in parlor. Den is trimmed with similar wood, and it contains bookcases built in, paneled divans, and a fireplace. Toilet room is conveniently located, and is wainscoted and paved with tiles. The entrance from porte-cochère is also a convenience. Dining-room is treated in the French Renaissance style, and is trimmed in a magnificent manner with old red mahogany. The wainscoting in panels and ceiling beams is handsomely carved, and the buffet built in, and the massive mantel is finished similar. The walls above wainscoting are covered with leather and burnt decoration. The floors throughout are of hardwood parquetry, in handsome designs. Kitchen, pantries and rear hall are trimmed and wainscoted with whitewood. Floors of birch. These apartments are provided with all the necessary fixtures in the most improved manner. Second floor is trimmed with ash, and it contains four bedrooms, eight closets, dressing-room, two bathrooms

and linen closet. Stationary bowls are provided in all the chambers. Bathrooms are finished complete, with exposed plumbing, and marble and tiled trimmings. Third floor contains three bedrooms, servant's bathroom and trunk room. Cemented cellar contains furnace, laundry and other apartments. Mr. H. H. Gridley, architect, 313 Union Street, Springfield, Mass.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT NUTLEY, N. J.

This cottage, shown on page 63, is built of clapboards, upon a stone foundation; there are pilasters on each angle of the exterior; the detail is simple, but very effective, and perfect taste; the chimneys are of red brick, and the roof is shingled. The cottage is pleasantly situated, surrounded with trees; the lawn is well graded, and altogether has a very effective appearance. The porch is deep and wide, and the piazza on the side is deep and shady. The plan is a central hall, with parlor and dining-room upon one side, and library and kitchen on the other. The pantry is in the rear, beneath the staircase landing, and connects the dining-room and kitchen. The chimney breasts in the parlor and dining-room are upon an angle. There are three bedrooms, one dressing-room and bathroom. The estimated cost is \$4,000. The architect was Mr. E. R. Sifton, of New York.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COLONIAL RESIDENCE AT ORANGE, N. J.

We publish on pages 64 and 65 a residence recently erected for John Hammond Bradshaw, M.D., at Orange, N. J. The perspectives present a pure example of modern Colonial architecture, and the interior throughout is of similar treatment. The elevations are ornamented with bay windows, porch and porte-cochère, while the lines of the roof are well broken by numerous dormer windows. The massive chimneys are also features in themselves. The underpinning is built of well burned red brick, laid up in red mortar. The superstructure above is built of wood, and the exterior framework is sheathed, papered, and clapboarded. It is painted Colonial yellow, and white trimmings. The roof is covered with cypress shingles, and left to weather finish. Dimensions: Front, 43 ft. 10 in.; side, 36 ft. 2 in., not including porch and porte-cochère. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior throughout is trimmed with whitewood, and is treated with three coats of paint, finishing in China white. The doors and windows have heavy moulded casings, and the latter have moulded seat and panel back. The windows are glazed with first quality of French glass. The floors are laid with first quality of North Carolina pine, in narrow widths, and polished. The ceilings in hall, parlor, library, and dining-room have massive, moulded wood cornices. The leaded windows, paneled divan, and old Colonial mantels carry out the antique effect. The hall is the most unique apartment. The double semicircular arch in this hall is supported on a fluted column with a carved Ionic cap. The pilasters on either side are also fluted. The newel post is formed with a cluster of spindle balusters. The treads and risers are turned out of oak. Parlor and library have open fireplaces, built of pressed brick, with hearths of same. The latter is furnished with ornamental bookcases, built in. Dining-room is well treated, and is provided with an open fireplace, same as the ones already described. The butler's pantry is fitted up with bowl, cupboards and dressers, inclosed with sliding glass doors. Kitchen is wainscoted with narrow beaded stuff, and is furnished with a range, sink, wash trays, and two pantries. The closet for ice-box has an outside entrance thereto. The second floor contains a large open hall, four bedrooms, five closets, and bathroom, the latter being wainscoted and fitted up with porcelain (Roman) tub, bowl, etc., with exposed plumbing. There are no apartments on third floor, but several rooms could be finished off if desired. Cemented cellar, contains furnace and other apartments. Messrs. Rossiter and Wright, architects, 47 Liberty Street, New York City, N. Y.

Our engravings were made direct from photographs of the building taken specially for the SCIENTIFIC AMERICAN.

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A RESIDENCE AT INDIANA, PA.

We give on page 56 the residence of Mr. Harry McCreary, at Indiana, Pa. Dimensions: Front, 37 ft.; side, 39 ft., not including porches. Heights: Cellar, 7 ft. 6 in.; first story, 10 ft.; second, 9 ft.; attic, 8 ft. Foundation walls are built of field stone, laid up at random to grade; above grade, of rock-faced work, laid in regular courses and pointed in red mortar. Exterior walls are sheathed with mill matched sheathing, and covered with waterproof sheathing paper. First story to tops of windows is sided with clear poplar siding, the pattern being what is known as "half V," and of uniform width, $4\frac{1}{2}$ in. to the weather. Above the first story window cornice, which is a continuation of the cornices of porches, the walls and gables are finished partly in shingles, and the balance in siding, the pattern being an imitation of very narrow clapboarding. Roof is sheathed and papered same as the walls, and covered with best "Pennsylvania slate," of small sizes. First floor plan shows a good arrangement of space; large front veranda, with clustered columns, and side and rear porches. Entering the house from the front veranda is a large vestibule, with neat parquet floor, and then comes a commodious hall, containing a handsome oak staircase, and giving direct access to all rooms on this floor excepting kitchen. On the right of the hall, and connected by large sliding doors, is the parlor, containing an open fireplace, which is fitted with a neat oak mantel, having tile hearth and facing, and a large beveled plate mirror. Large front

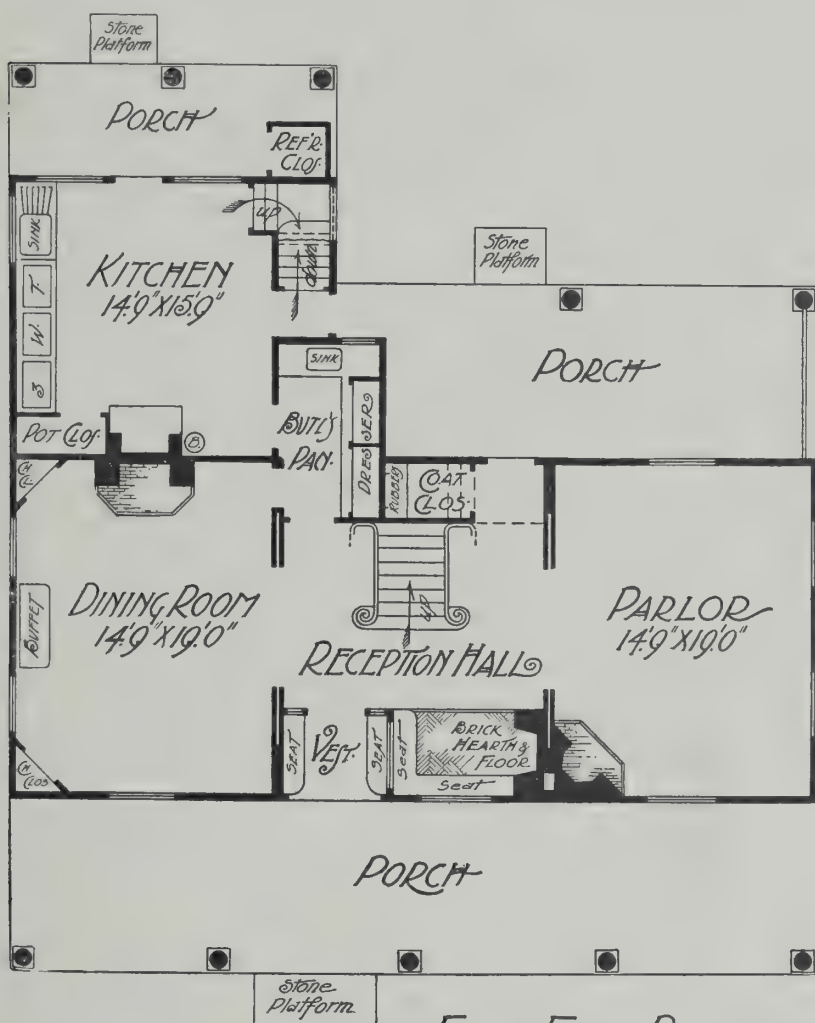
of house is finished in white pine; all finished natural; sliding blinds throughout. Exterior is painted pearl gray, with white trimmings and black sash. House complete, including furnace, mantels, blinds, plumbing and chandeliers, cost \$4,350. The architect and builder was Mr. E. M. Lockard, of Indiana, Pa. Stairway window is large and filled with leaded glass, as is also the small window above front doors and window in room over dining-room. Plastered with King's Windsor cement plaster.

Our engraving was made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

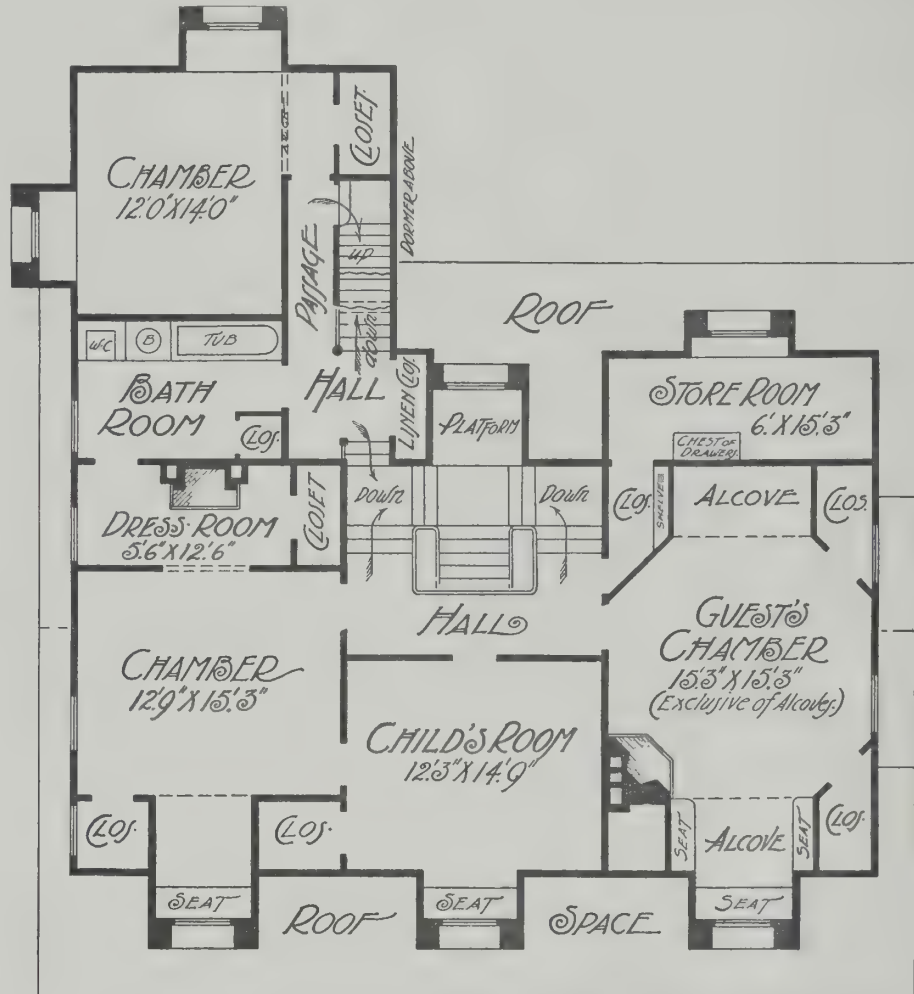
A RESIDENCE AT BRONXVILLE, NEW YORK.

We publish on page 57 a residence erected for Samuel S. McClure, Esq., at Armour Villa Park, Bronxville, New York. The engravings present a good example for a square-rigged house, with good substantial elevations, and floor plans, showing many large rooms, well arranged and handsomely finished. The underpinning and chimneys are built of brick, laid up in red mortar. The building above, of wood, is constructed in a thorough workmanlike manner, with first class materials. The exterior is covered on the first story with clapboards, and on the second and third stories with shingles. It is painted pearl gray. The roof is slated. Dimensions: Front, 48 ft.; side, 48 ft., not including piazza. Height of ceilings:

effect desired of an old English house has been successful, the result representing many hours of study on the part of the owner, W. T. Taliaferro, Esq. Underpinning and first story, red brick, cut stone for window heads, sills and steps; exterior framework above covered with plaster, sand finish, left natural color, timbering as well as trimmings being painted brown; extension clapboarded and painted same color; chimneys of brick, with terra cotta chimney pots; dolphin bracket supporting overhang of roof, of same material. The sash are all casement hung, and glazed with leaded glass. Roof is covered with Spanish tiles, red in color. Dimensions: Front, 49 ft.; side, 40 ft. Heights: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft. 6 in.; attic, 8 ft. The first floor plan shows a central reception hall, with fireplace; wainscoted 6 ft. high; ornamental newel, with turned balusters, 2 to the tread, all in light oak; ceiling paneled off with oak strips. Parlor, connecting by sliding doors, has angle fireplace, bay and mullioned window. The walls are covered with yellow cartridge paper, frieze and ceiling lighter tint, trim white. Smoking-room or den has brick fireplace, rough plaster walls, terra cotta in color, and oriental hangings. Butler's pantry and kitchen, with usual fixtures. Dining-room has old-fashioned fireplace, tiled in dark green, bay effect, with seat, and is wainscoted 5 ft. 6 in. high; walls terra cotta in color, lighter tint of cartridge paper for ceiling. Second floor, finished in white pine, is divided into four chambers and bathroom. One room finished in attic. Cellar



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

A DWELLING AT GLEN RIDGE, N. J.—See page 54.

window with plate glass, and transom at top, filled with leaded glass. On the left of the hall is the library, also connected by a sliding door. Library is provided with an open fireplace, with hardwood mantel, having tile hearth and facings and beveled mirror, and fitted with andirons and gas logs for natural gas. Adjoining the library and connected by a sliding door is the dining-room, having an open fireplace, hardwood mantel, with tile hearth and facings, and large mirror; connecting direct with the hall, and with the kitchen through a back hall, out of which are the stairs to the cellar and the back stairs to second floor. Communication between dining-room and pantry is through the china cupboard, and with the side street through a lobby and side porch. Kitchen has maple floor, sink, cupboard, etc. Pantry is provided with all the necessary cupboards, drawers, bins, etc., and connects with kitchen by a sliding door. Second floor contains hall, and opening from it are four chambers, bathroom, linen room, backstairs to first floor and stairs to attic. Each chamber is provided with a large closet. Bathroom is wainscoted to height of four feet, with narrow, beaded ceiling boards of oak and yellow pine, board about. Plumbing is all of openwork, and includes hot and cold water in bathroom, kitchen, and basin in side hall on first floor; attic has one finished room and plenty of storage room. Cellar contains furnace, laundry, fuel room and vegetable room. Two rooms of second floor have open fireplaces, with hardwood mantels, having tile hearth and facings and large mirrors. Hall, parlor, library and dining-room are finished in red oak. Balance

Cellar, 8 ft.; first story, 10 ft. 6 in.; second, 9 ft. 6 in.; third, 8 ft. 6 in. The interior throughout is trimmed with whitewood. The floors are laid with hardwood. Hall and lobby are finished in oak. It contains an ornamental staircase turned out of oak. The archway is furnished with a spindle transom. Parlor is finished in mahogany, library in cherry, and dining-room in oak. They have open fireplaces, built of brick, with tiled trimmings, and carved mantels of hardwood. The woodwork in the kitchen and pantries is finished with hard oil. These apartments are wainscoted and finished with the usual fixtures complete. The second floor is finished in cherry, except alcove and bedroom, over library, which is treated in ivory white and gold. This floor contains four bedrooms, dressing room, and bathroom. The bedrooms are provided with ample large closets. Bathroom is provided with the best improvements and is wainscoted with narrow beaded stuff. Three bedrooms and ample storage on third floor. Cemented cellar, contains furnace and other apartments. Cost, \$8,000, complete. Mr. Henry S. Rapelyea, architect, Mount Vernon, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT GLEN RIDGE, N. J.

We give on page 62 an attractive residence in the Elizabethan style, located at Glen Ridge, N. J. The design is pleasing, and appropriate to its surroundings; the

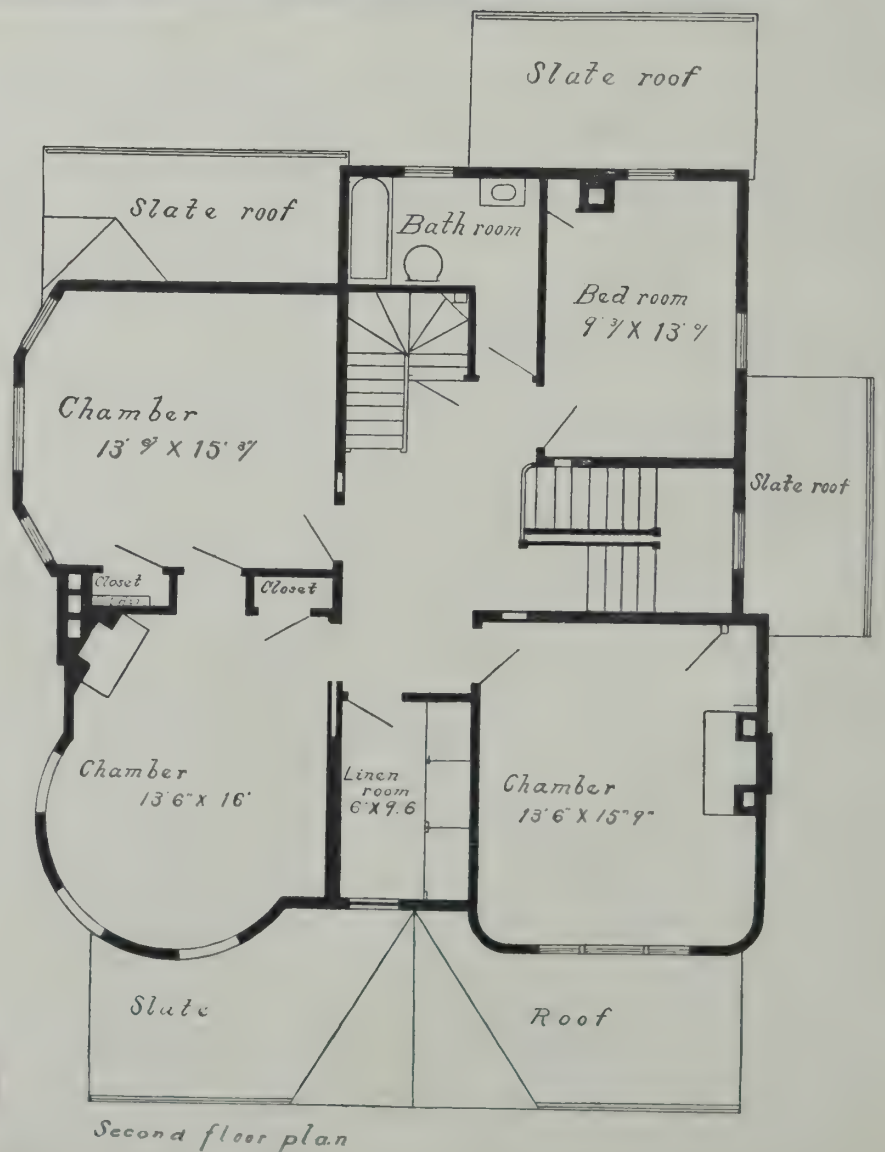
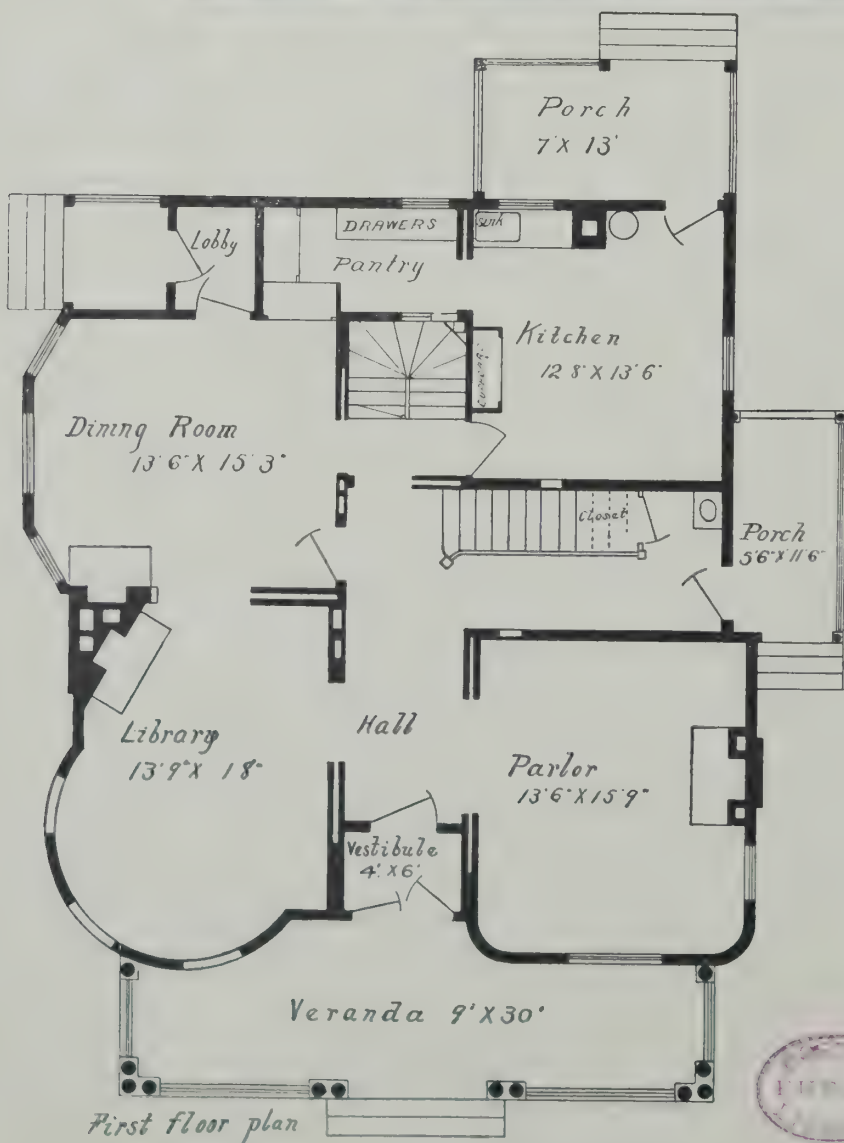
cemented, contains fuel, storage, heater, etc. Inside sliding blinds are used, and house is lighted by gas. Architect and builder both deceased.

Our plans were made from measurements and engravings from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

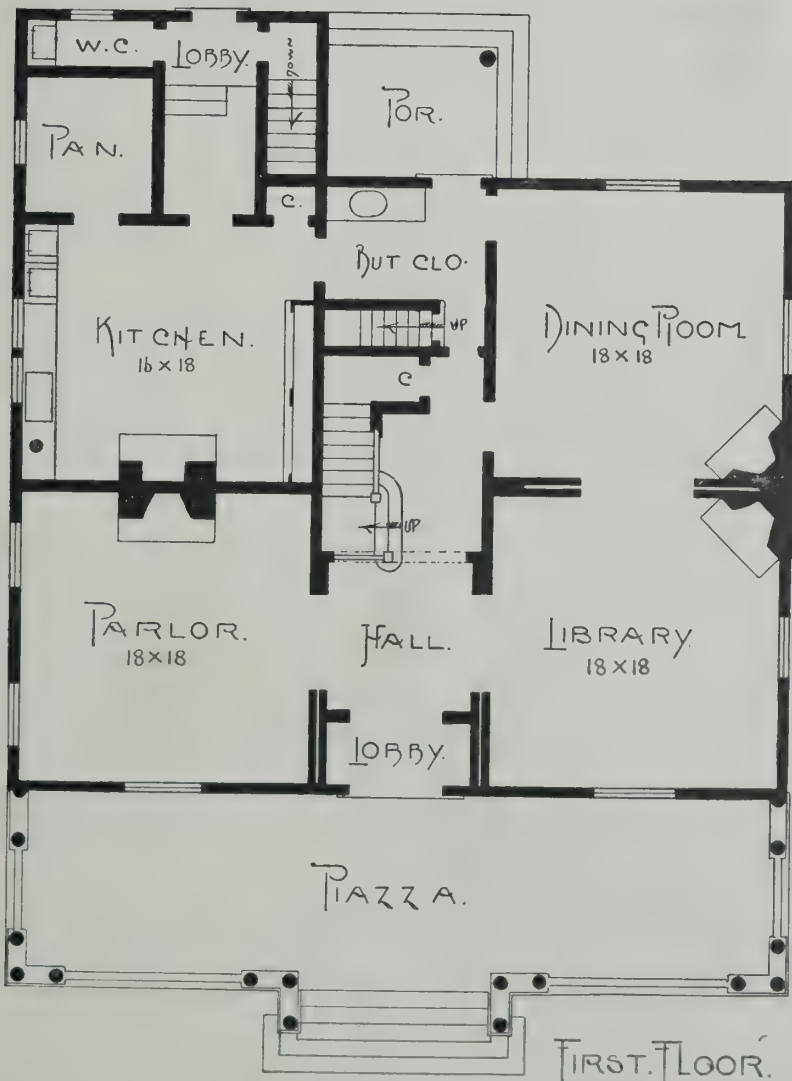
A CARRIAGE HOUSE AT ORANGE, N. J.

On page 65 we present a stable recently erected for John Hammond Bradshaw, M. D., at Orange, N. J. The design is treated in the modern Colonial style to correspond with the architecture of the residence. The building has a footing of stone and an underpinning of local red brick, laid up in red mortar. The exterior framework above is sheathed, clapboarded, and painted Colonial yellow, with white trimmings. The roof is covered with cypress shingles, and left to weather finish. The interior throughout is ceiled with North Carolina pine, beaded, and in narrow widths. The walls and ceilings are finished natural. The carriage room is fitted up with carriage wash, and harness closet, with sliding glass doors. The stable contains one box stall and two single stalls. These stalls are finished with the usual iron fixtures, etc. The stairway leads to second floor, which contains man's bedroom and hay loft. Messrs. Rossiter and Wright, architects, 47 Liberty Street, New York.

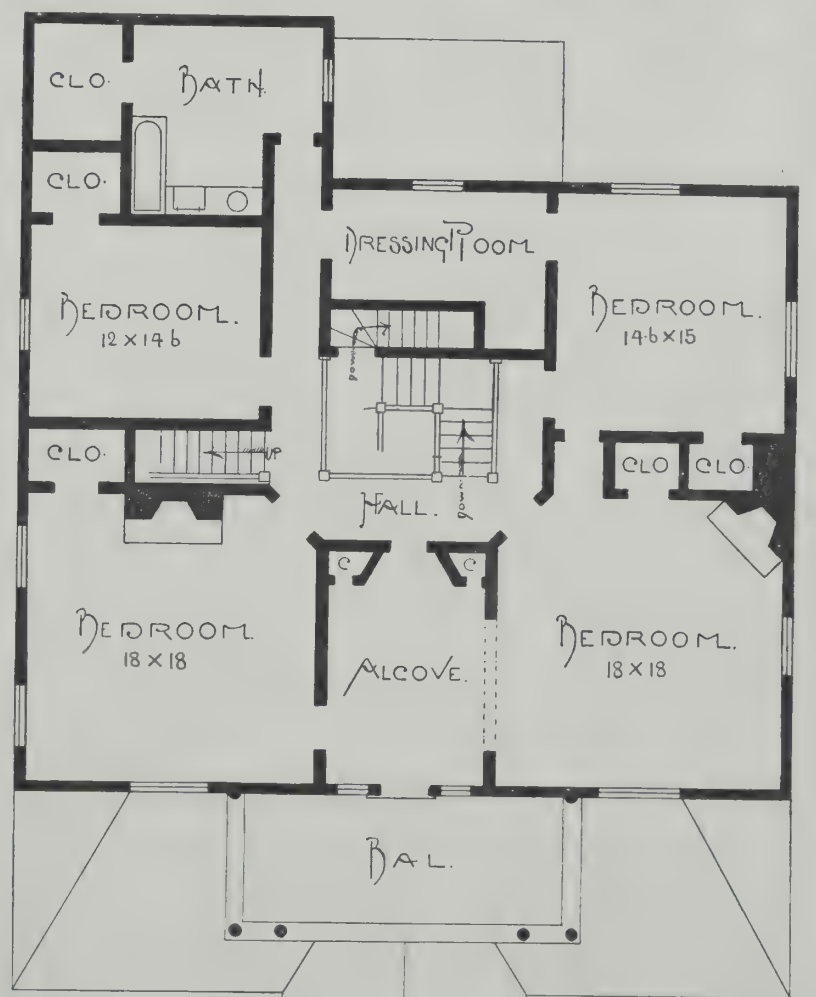
Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.



A RESIDENCE AT INDIANA, PA.—See page 55.



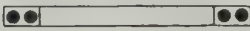
FIRST FLOOR.



SECOND FLOOR.

A RESIDENCE AT BRONXVILLE, N. Y.—See page 55.





PORTE-COCHERE.

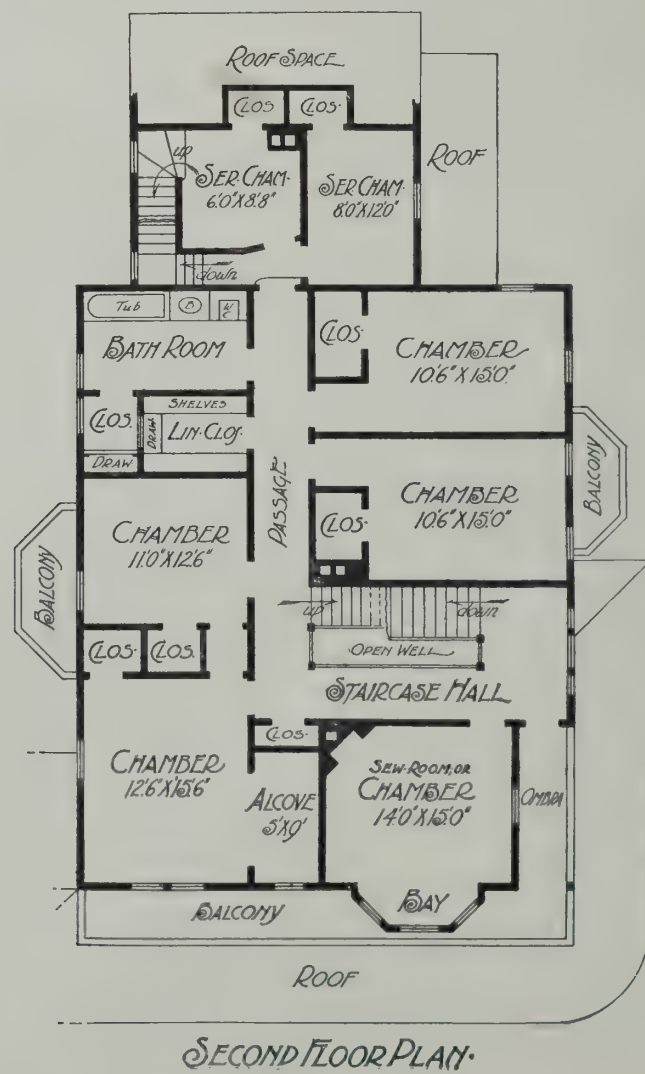
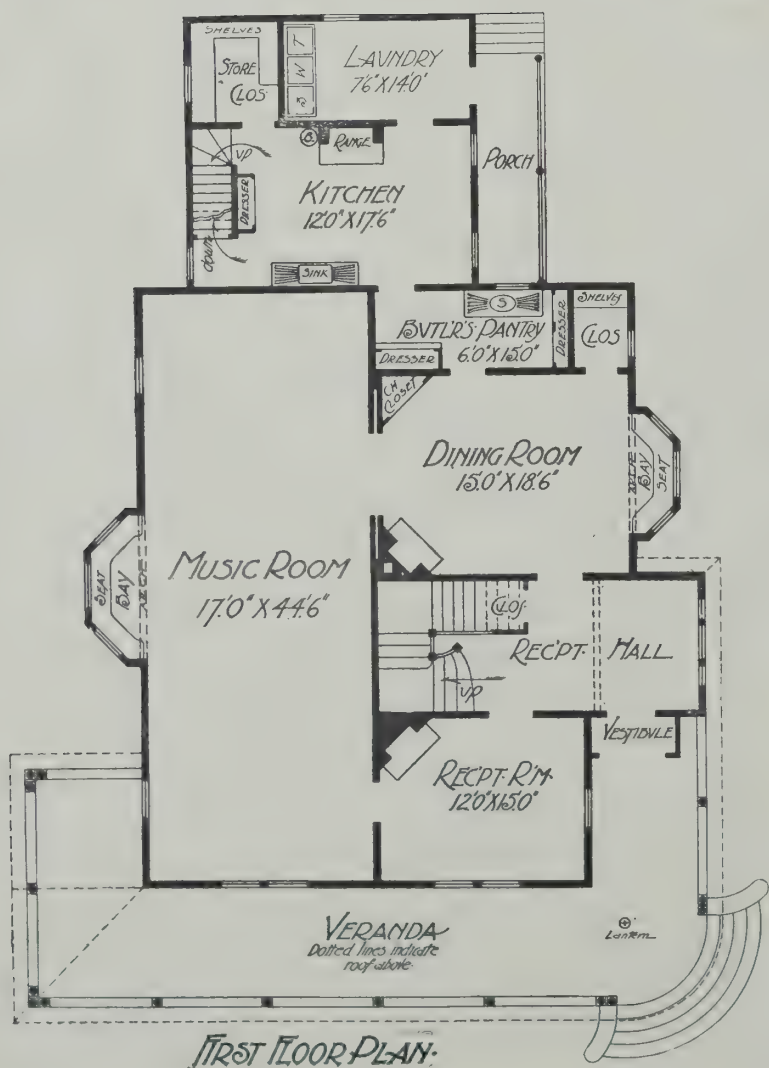


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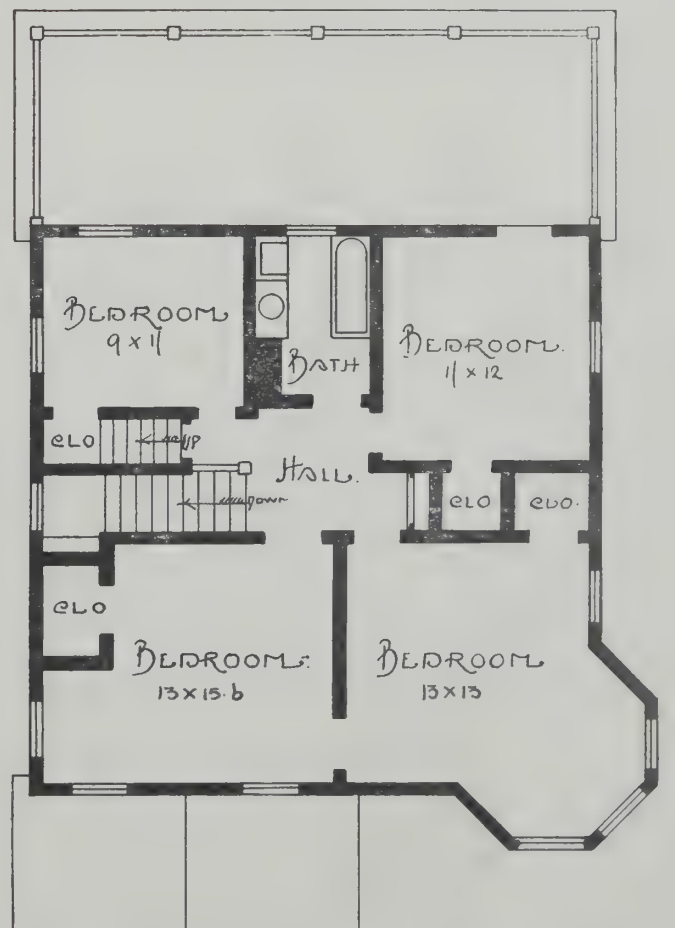
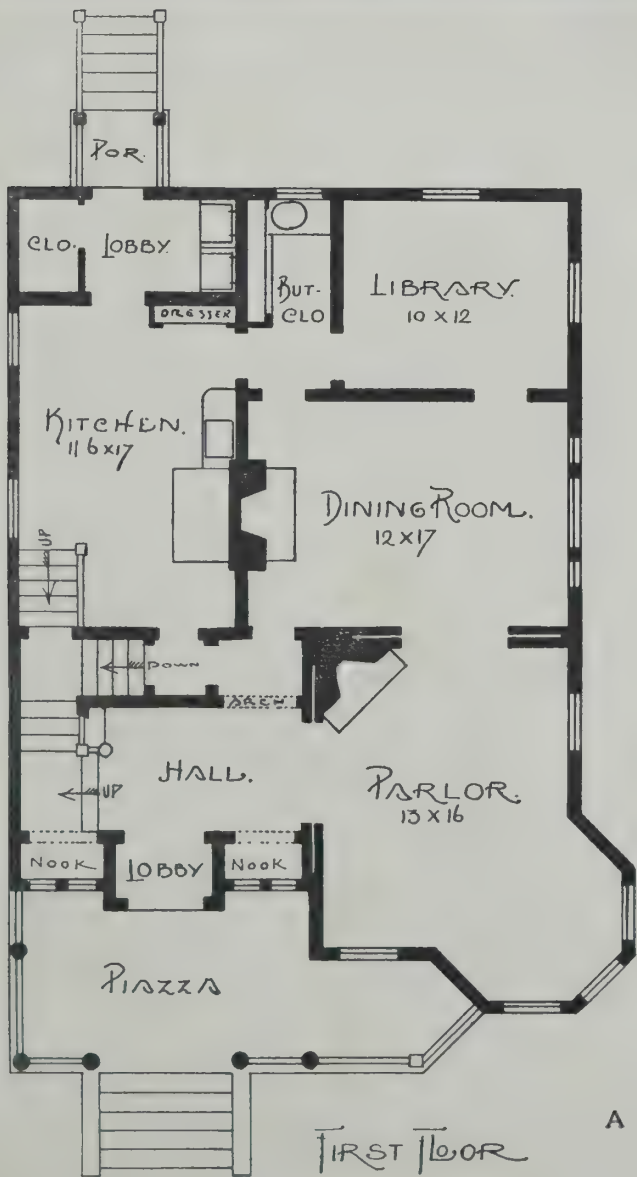
A RESIDENCE AT HOLYOKE, MASS.—See page 54.



SECOND FLOOR.
A RESIDENCE AT HOLYOKE, MASS.—See page 54.

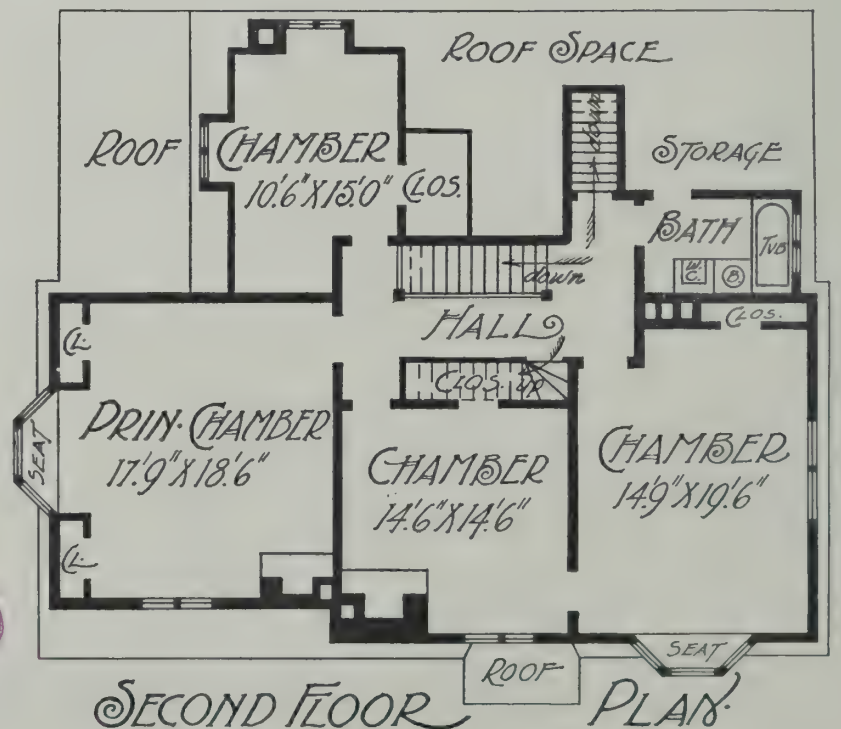
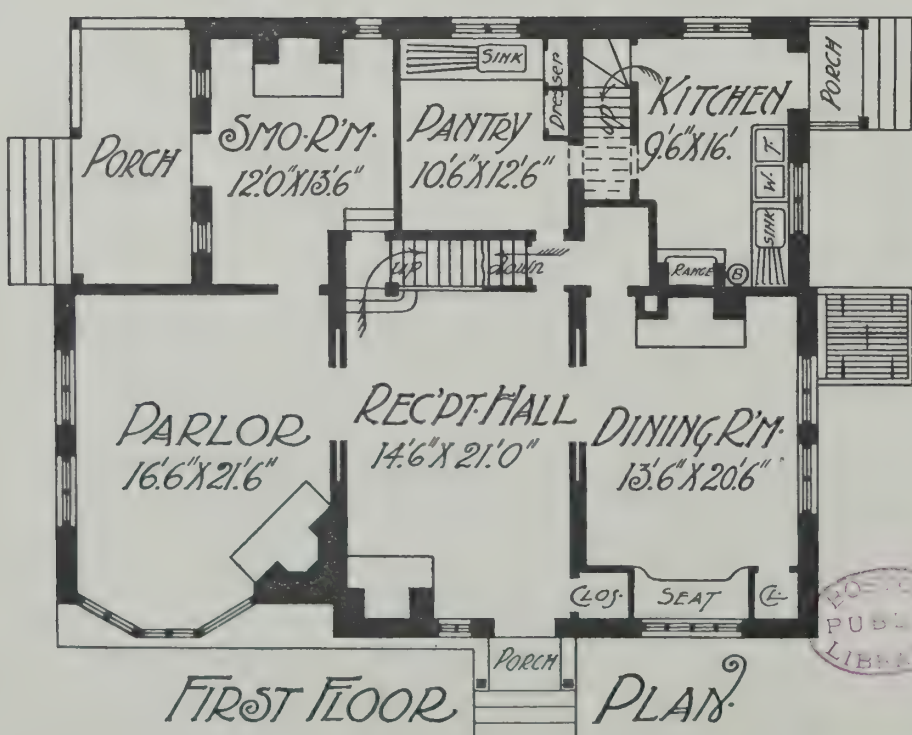


A RESIDENCE AT FLATBUSH, L. I.—See page 66.

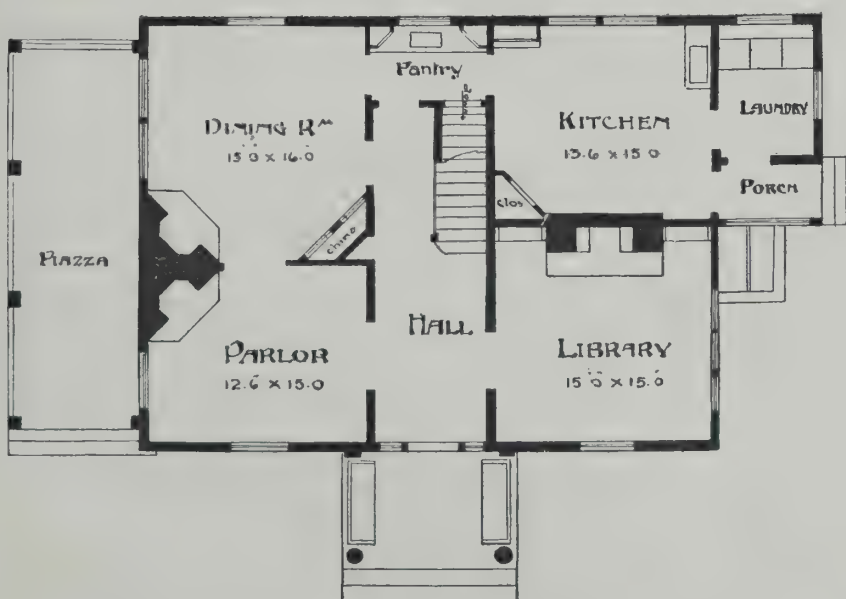


SECOND FLOOR.

A HOUSE AT PARK HILL, N. Y.—See page 66.



A COTTAGE AT GLEN RIDGE, N. J.—See page 55.

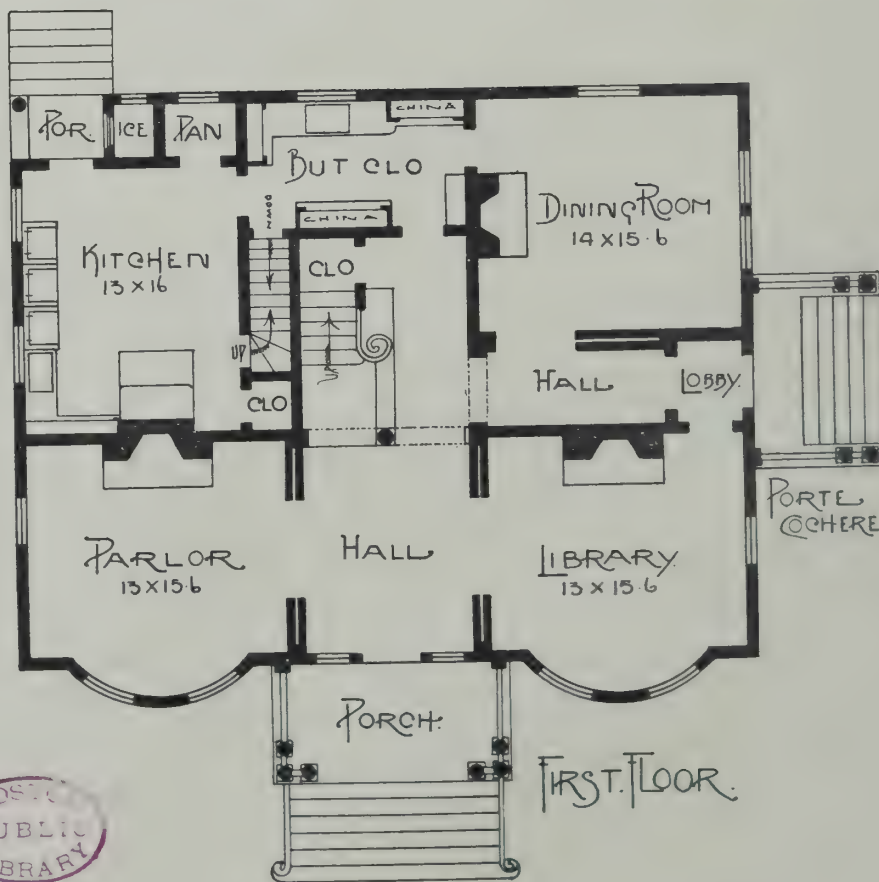
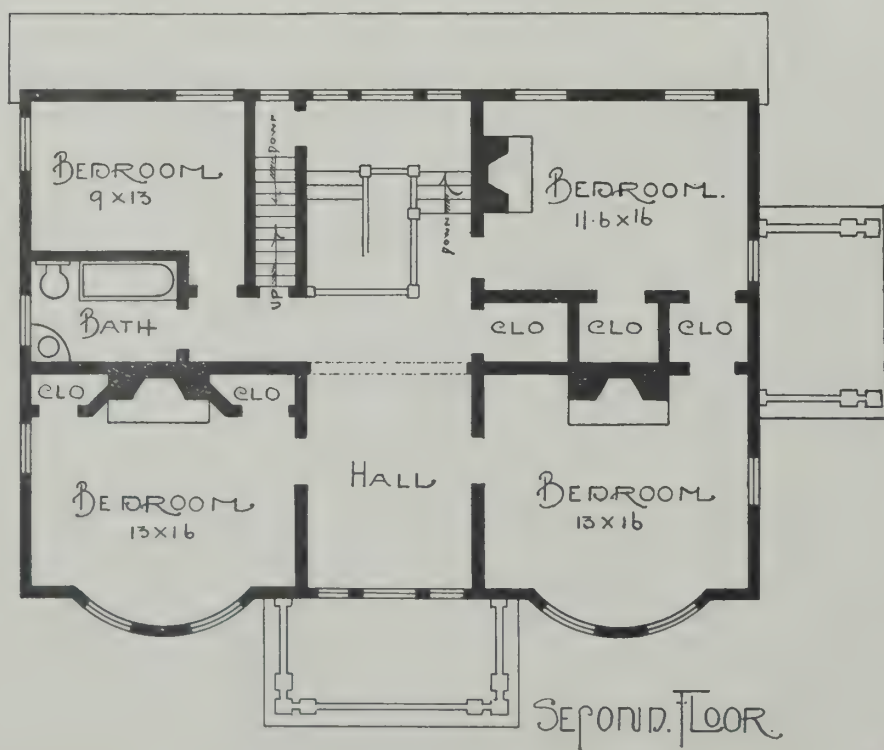


FIRST FLOOR PLAN



SECOND FLOOR PLAN

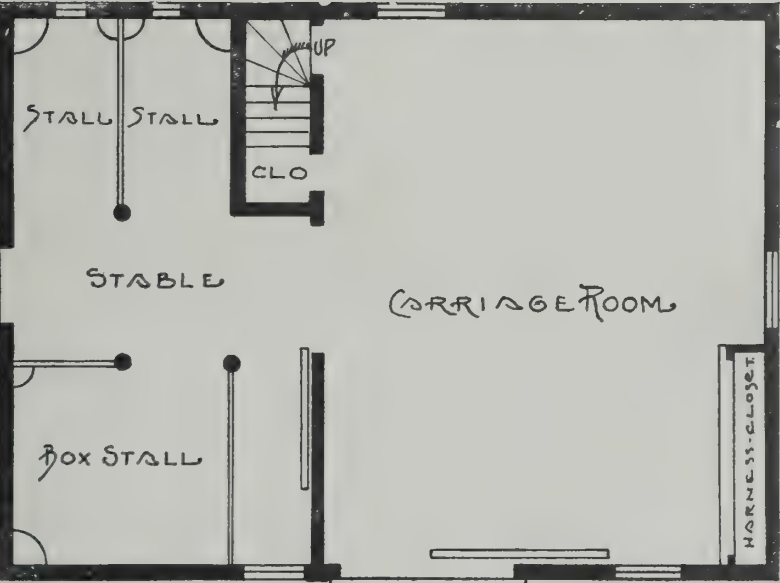




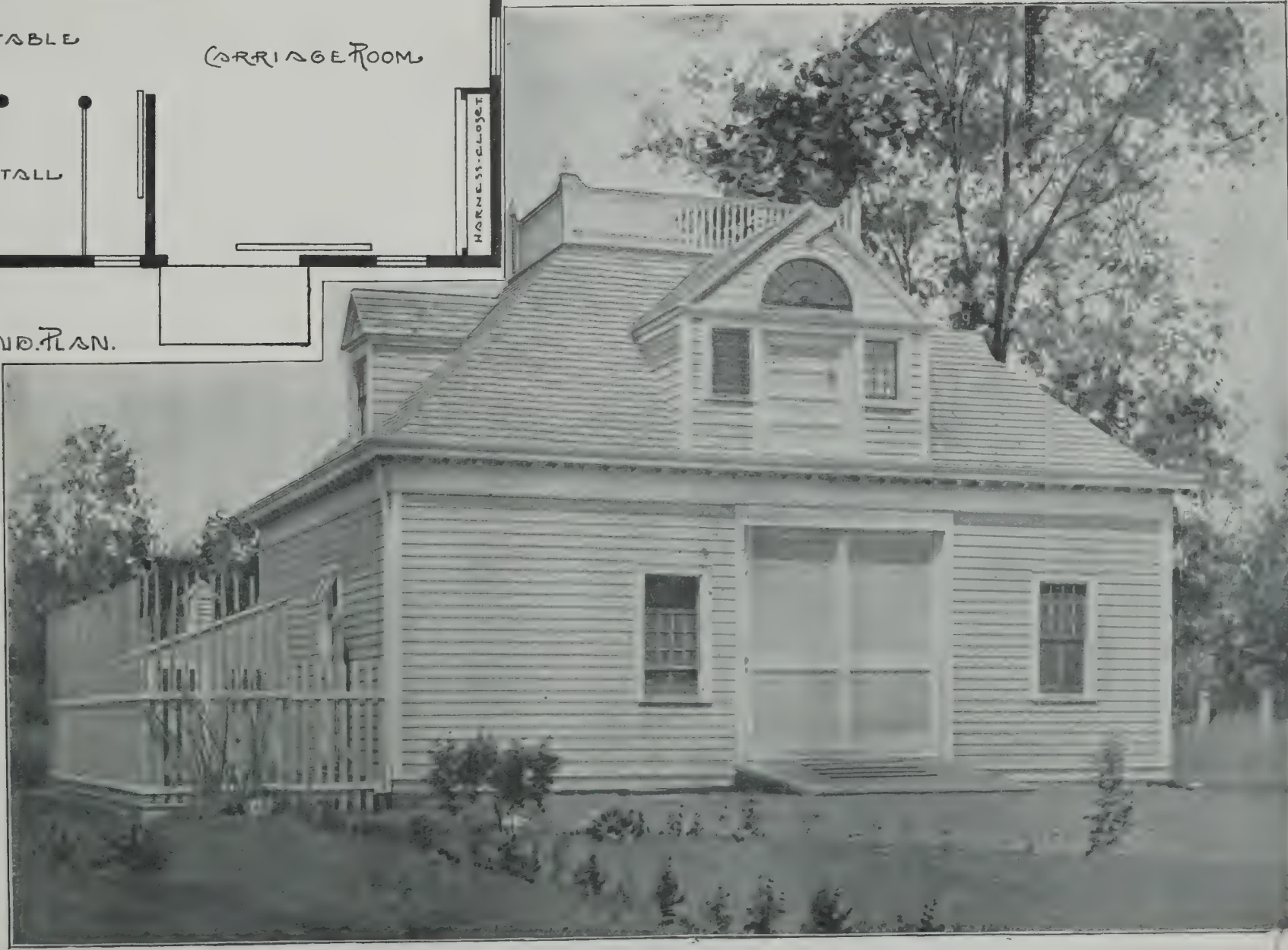
A COLONIAL RESIDENCE AT ORANGE, N. J.—See page 54.



A COLONIAL RESIDENCE AT ORANGE, N. J.—See page 54.



GROUND PLAN.



A CARRIAGE HOUSE AT ORANGE, N. J.—See page 55.

A RESIDENCE AT FLATBUSH, L. I.

The subject of illustration on page 60 is the residence of C. H. Wheeler, Esq., in Tennis Court, Flatbush, L. I. The exterior is broadly treated, with overhanging gables, dormers, balcony, and well shaded veranda running the full front, the roof of which is supported by Tuscan columns, placed on shingled rail. Dimensions: Front, 42 ft. 6 in.; side 66 ft., including extension, but not veranda projection. Heights: Cellar, 7 ft.; first story, 10 ft.; second story, 9 ft.; attic, 8 ft. Underpinning of brick, 12 in. in thickness; exterior framework above sheathed, papered, clapboarded, and painted light yellow on first story, all above, including roof, being shingled and left to weather. Trimming color dark, and blinds light gray. Lattice work yellow. The principal feature of the first floor plan is the music room, trimmed in cypress, which runs full depth of main structure; has bay with seat, and connects with dining-room through 6 ft. sliding doors with elliptic head. This room has angle fireplace and china closet, bay with seat and closet, and is trimmed in quartered oak. Butler's pantry has large dresser and sink, and is means of passage to kitchen, complete with usual fixtures, and store closet. Laundry, in extension, has three tubs, and sash door to rear porch. Last named rooms finished in white pine. Hall finished in quartered oak, natural, has widest staircase of easy rise, with ornamental newel and turned balusters, and is lighted by leaded glass window of pleasing design. Reception room of good size, in cherry, has angle fireplace, and mantel of neat design. Staircase hall on second floor; plan shows triple window, glazed with leaded cathedral glass. There are four chambers, with generous closet accommodation, sewing room, with angle fireplace, linen closet, two servants' and bath rooms, with fixtures of best make. Attic has billiard room, 18 ft. 6 in. x 20 ft., and two bedrooms finished off. Store room and attic space left unfinished. Cellar, cemented, has cold room with hanging shelf. Servant's W. C., brick set furnace, fuel storage and bicycle room. Plans prepared by J. G. Richardson, Esq., J. C. Sawkins, Esq., builder, both of Flatbush, L. I. Cost complete, \$11,000.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A HOUSE AT PARK HILL, NEW YORK.

We present on page 61 a dwelling house which has been completed for Messrs. Loreni and Morrow, at Park Hill, New York. The elevations are good and the plans excellent. The underpinning is built of local rock-faced bluestone. The first story framework is covered on the exterior with clapboards, and painted light olive green, with bottle green trimmings. The second story is covered with shingles and painted red. The roof is shingled and left to weather finish. Dimensions: Front, 33 ft.; side, 43 ft., exclusive of piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft. 6 in.; second, 9 ft.; third, 8 ft. The hall is a unique apartment. It is trimmed with oak, and it has a hardwood floor and a paneled wainscoting. The staircase is a handsome one, with carved newel posts and candelabra. The nooks have archways with spindle transoms, and are lighted by windows glazed with stained glass, with good effect. Parlor and dining-room are trimmed with oak, and the former has a false fireplace, trimmed with tiles and furnished with a hardwood mantel, carved, and provided with mirror and columns. Dining-room has a fireplace with facings and hearth of tiled brick, and mantel of oak. Library is conveniently located, and is trimmed with oak. Kitchen and pantries are wainscoted, and each is fitted up with the usual fixtures. Lobby is large enough to admit laundry tubs, which is a convenience. There are four bedrooms and bathroom on second floor. This floor is trimmed with hardwood. The bathroom is wainscoted, and furnished complete. Third floor contains servants' bedrooms and storage. Cemented cellar, contains furnace and other necessary apartments. Cost, \$6,500, complete, including steam heater. Mr. Edmund J. Maurer, architect, 228 West 121st street, New York.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

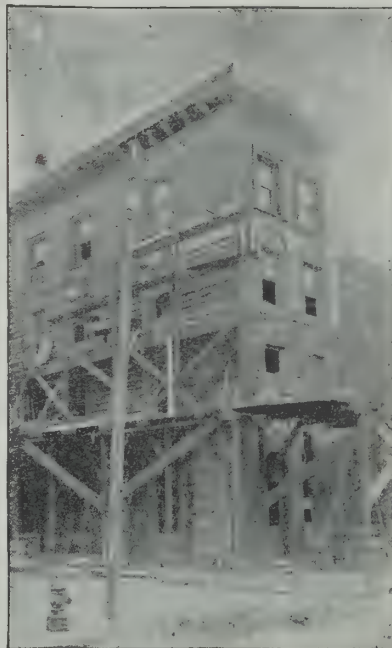
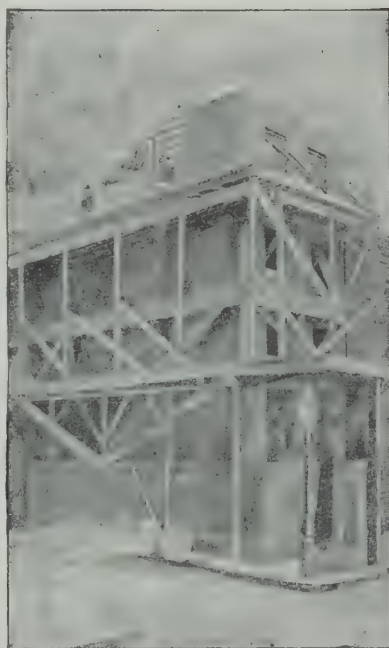
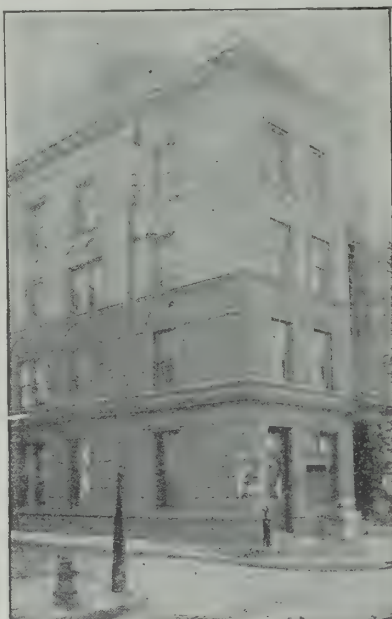
THE work of excavating a channel of 20 feet depth through the waters of the Great Lakes between Chicago, Duluth and Buffalo, begun in 1893, is more than two-thirds completed. The work is divided into eight sections. The first four sections include the excavation in Sault Ste. Marie River, 21 feet deep and 300 feet wide.

Modern Innen Decoration.

This is the title of a new publication, issued monthly, in Darmstadt, by Alexander Koch. It is elegantly illustrated with plates, chiefly relating to interior decoration. The two numbers before us are adorned with splendid designs, such as parlors, dining-rooms, boudoirs, bedrooms, sitting-rooms, walls, ceilings, halls, cabinets, libraries, stairways, draperies, furniture, etc., all of which indicate the highest ability, and reflect great credit upon the artists, authors and editors of the work.

THE EVOLUTION OF AN OLD BUILDING.

The accompanying illustrations represent recent alterations made in, or rather a complete transformation of, an old building, by the Austin Metal Cornice and Roofing Works, Messrs. Gara, McKinley & Co., 21 S. 17th Street, Philadelphia, Pa. The firm are originators of highly artistic designs in, and large manufacturers of, patent sectional metal ceilings and side walls, rock-facing, decorative art steel sheets, and a large line of similar work, and most appositely make the suggestion, "What we have



THE EVOLUTION OF AN OLD BUILDING.

done for ourselves we can do for others. The pictures are all reproduced from photographs, the first one showing the building in its original condition, while the adjoining view represents the structure as it has been transformed. One of the lower views represents an additional story being added, using the old brick from the back wall, and the last picture shows the putting on of the "rock facing"—old bricks being plugged, strips secured to the plugs, and the "rock facing" attached to the strips. It may well be, as we are informed was the case, that such a transformation of an old building attracted not a little attention, and gave rise to a good deal of comment in the neighborhood where the improvement was carried out.

Wood Stains.

A solution of 50 parts of commercial alizarin in 1,000 parts of water, to which a solution of ammonia has been added drop by drop until a perceptible ammonia odor is developed, will give to fir and oak a yellow-brown color and to maple a red-brown. If the wood is then treated with a 1 per cent. aqueous barium chloride solution, the first named become brown and the latter a dark brown. If calcium chloride be used instead of barium chloride, the fir becomes brown, the oak red-brown, and the maple

a dark brown. If a 2 per cent. aqueous solution of magnesium sulphate be used, the fir and oak become dark-brown and the maple a dark violet-brown. Alum and aluminum sulphate produce on the fir a high red and on oak and maple a blood red. Chrome alum colors maple and fir reddish brown, and oak Havana brown. Finally, manganese sulphate renders fir and maple a beautiful dark violet brown and oak a dark walnut-brown.

Wood Finish Chemically and Microscopically Examined.

Some time ago, at New Haven, Conn., in the erection of the White and Berkeley dormitories, the architects distinctly specified that the wood used in the interiors should be filled with Wheeler Patent Wood Filler and finished with three coats of varnish. From the results obtained the architects were convinced that the Wheeler filler was not being used, or that only a very small portion of the required filler was employed.

Prof. S. W. Johnson, of the Sheffield Scientific School of Yale University, was therefore called upon to make an examination of the filled and varnished wood. He was also asked the question whether, if a manufacturer would substitute for the silix used in the Wheeler filler a silix of a different nature, he could distinguish the difference and testify to this in court. He has now handed in his opinion, under date of Jan. 19, 1895, in which he gives the report of a chemical and microscopical examination made with the scrapings from the finished surfaces of the White and Berkeley Dormitories at Yale, also from the finished surface of a piece of oak filled with the Wheeler Patent Wood Filler, and states that the evidence is decisive that the wood of the White and Berkeley Halls was not finished by any proper and exclusive use of the genuine Wheeler Patent Wood Filler, but was filled with some material whose preponderating ingredient is carbonate of lime. The Bridgeport Wood Finishing Company proposes to cooperate with the architects and owners to prosecute any imposition of this kind. In the case alluded to these buildings are to be cleaned off to the wood again at a cost of \$5,000.

A Tubular Frame House.

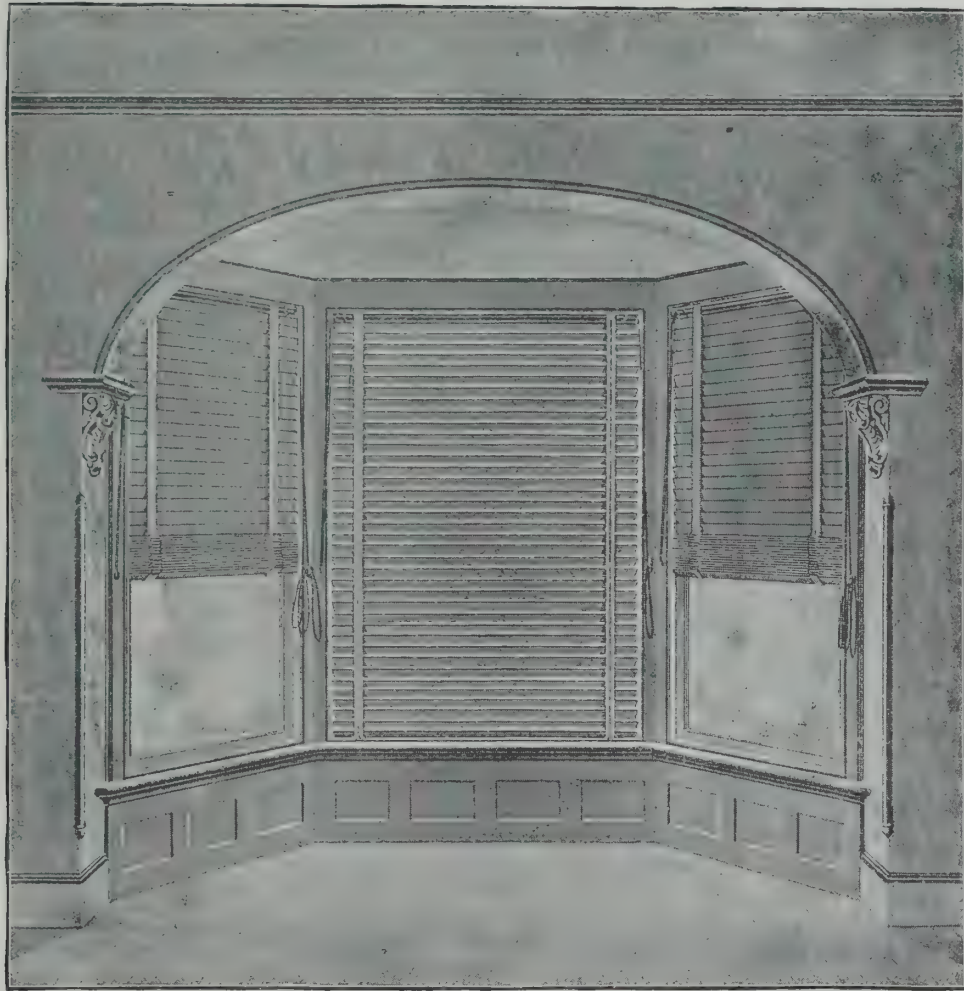
M. Caron, of Chamounix, has just built a most peculiar house, for which he claims, first, a constant temperature, and incidentally strength, durability, comfort and beauty. The change of temperature in the valleys of this mountainous region is frequent and severe, and the building of such a house was prompted by the severity and instability of the climate. Mr. Caron first put up a frame of steel water tubing, allowing continuous circulation to a stream of water. Around this frame he put up his house in the ordinary way, the entire structure being a very pretty specimen of the early Italian Renaissance. The peculiarity is that all floors and ceilings are likewise crossed and recrossed by the water pipes. The water, after passing through the horizontal tubes first, that is, under the floors and ceilings, passes through the vertical tubes until all have been gone through. In summer, spring water, fresh as is only the water of the snow-capped Alps, circulates under pressure through the network of tubes, cools off the walls, and, after having run its course, flows off considerably warmer than when it entered. But in its course it has absorbed much heat, which it carries away. During the long and severe winter the water, entering through the basement, is first heated to nearly 100 degrees, and then forced through the tubing. Of course, much of the heat is left all over the house, and at the outlet the temperature of the water is about 40 degrees. The speed of the circulation of water can be regulated so as to allow the fixing of a certain temperature for the house, which is equal throughout. The house has been put to a practical test through the last eight months, and has stood the trial well. The builder claims for it cheapness, solidity, and elasticity, giving it immunity against earthquakes. The house measures about 6,000 cubic yards, and weighs 120 tons, or 36 pounds per cubic yard inclosed. It is fireproof, having running water in every room, and fire can be drowned out in a remarkably short time.—*La Nature*.

To Destroy Hothouse Insects.

A practical floriculturist who has tried many remedies for removing insects from house plants prefers, above all applications, a soap made from the oil of the fir tree. When properly used, he finds that it effectively does away with the "aps," "mealy bug," and scale.

VENETIAN BLINDS.

What is known as the "Albany" Venetian blind is a simple, light in weight, durable, and very practical device for controlling the light entering a window, and does not interfere with the hanging of curtains, draperies or shades at the same window. It can be readily hung or taken down in a moment, and does not need a cornice. It is made by the Albany Venetian Blind Co., Albany, N. Y.,

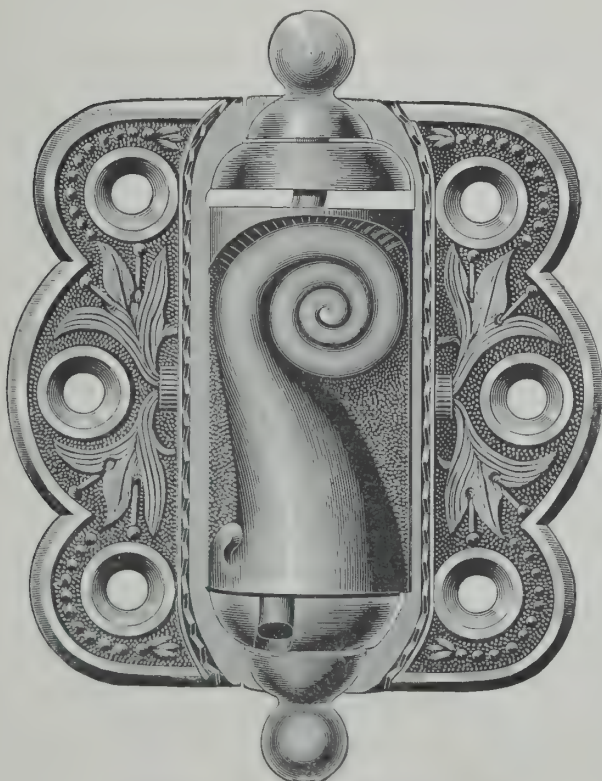


BAY WINDOW—ALBANY VENETIAN BLINDS.

and the tapes or webs used, made especially for the company, have the cross pieces which hold the slats woven in. The mechanism is contained in the headrail, which has swiveling pulleys, made of lacquered brass, over which the hoisting cords run. A hoisting cord on one side elevates or lowers the blind as desired, and a ventilating cord on the other side opens or closes the slats.

AN IMPROVED SPRING HINGE.

The hold back screen door spring hinge shown in the illustration is of most attractive and original design and



A NEW HOLD BACK SPRING HINGE.

symmetrical proportions. It is being manufactured by the Stover Manufacturing Company, of Freeport, Ill., and is made in all finishes of both iron and bronze metal.

Cement Mortar.

About eight parts of furnace ashes, slag, or coke, four parts of slaked lime, and one of clay, are taken and mixed dry so as to form a cement, which, on mixing with water, sets in the ordinary way. The proportions of the materials may be varied so as to produce either an aerial or hydraulic cement.

A Blind Architect.

Many people will be interested to know, says the *American Architect*, that the architect who planned the library and natural history building of the Perkins Institution for the Blind, in Boston, besides several tenement-houses belonging to the institution, is himself a pupil of the institution, and is totally blind. This clever man works out his ideas, as he modestly says, in his head,

and then sketches them in raised lines, not to scale, but with the principal dimensions marked, and the windows, doors, closets and projections of the plan clearly shown. These sketches are put into the hands of a draughtsman, who redraws them to scale, under the direction of the designer. In this way the blind architect, Mr. Rear-don, has gained a considerable professional experience. The institution does a good deal of building, and he understands its needs thoroughly, and knows how to make sure that they will be satisfied, and he is probably the best architect that could be employed under the circumstances. It is curious that Mr. Campbell, the distinguished director of the London College of Music for the Blind, who was for many years an officer of the Boston institution, and has been totally blind from his youth, has

also been able to be of much use to the establishment under his charge in its building work. We have heard him recount his experiences during the construction of the buildings of the College. The workmen, apparently, imagined that, as the occupants of the rooms would not see what was about them, it made no particular difference how it was done. They were soon undeceived. Mr. Campbell, as soon as any part of the buildings was in condition to be inspected, had step-ladders brought, and commenced a thorough inspection, with his fingers. All the plastering was gone over, and where important defects were found, the work was rejected, and the plastering had to be pulled off, and done over again. The wood-work was criticised in the same way; and, in the end, the College buildings were finished with a minute care which would hardly have been shown if a skilled clerk-of-works, with the best and sharpest vision, had had the supervision of them.

Frozen Water Closets.

The discomforts, not to say dangers, which attend the freezing of water pipes are alone hard enough to endure; but when the frost is so severe and stays so long with us as to lead to the stoppage of soil pipes we are brought face to face with a new evil which demands very prompt and careful action. We learn that in many houses in the suburbs of London this has occurred, and that in many cases the occupiers have been obliged to carry the excreta into the garden or to avail themselves of the premises of an obliging and more fortunate neighbor. When the thaw does set in, the consequence of this condition of things may be very serious, and those who are unfortunate enough to be in such an unenviable position should have a stock of some efficient disinfectant at hand. It would be a proper and useful preliminary precaution to place a quantity of disinfectant liquid, such as carbolic acid, in the pan of the frozen closet. The public health authorities might, we suggest, help the people in this matter, so that pestilence and disease may not be counted among the contingencies which prolonged frost brings in its train.

[The above, from the *London Lancet*, suggests that the same precaution against the danger arising from frozen pipes is as important to our people as to Londoners.—ED.]

AN ELECTRICAL MAIL BOX.

This letter box requires no additional wiring or battery, being connected on the same line with the push button of the door bell. It is manufactured by the Franklin Electric Co., J. D. Price, manager, No. 51 Wabash Avenue, Chicago. The electrical parts are very simple, there being nothing to get out of order or wear out.

When the door or flap is opened to insert mail, the door bell rings a predetermined length and number of times, thus giving notice to the housewife that it is mail or a circular being dropped in the box, and not a caller at the door. If any person tampers with the box, trying to extract letters, the door bell will ring continuously, thus giving alarm. These boxes are made in several styles both for flush and exterior work.



THE ANCHOR FENCE POST.

The steel fence post, especially adapted for wire fences, which may be anchored in the extremely simple manner shown in one of the accompanying illustrations, appears to possess the utmost degree of efficiency and simplicity, and the high favor in which it is held may be readily understood. It is a drive post, through whose base two braces or blades are driven diagonally into the ground,



PUTTING DOWN THE ANCHOR FENCE POST.

interlocking, as they are driven, with the base of the post and with each other. These braces afford a very firm hold on the ground, and the manner in which they are placed is the extreme of simplicity. No holes need be dug in setting, except one about six inches in depth, to cover the head of the top blade after it has been driven in. Wires are easily attached to these posts, and they will last

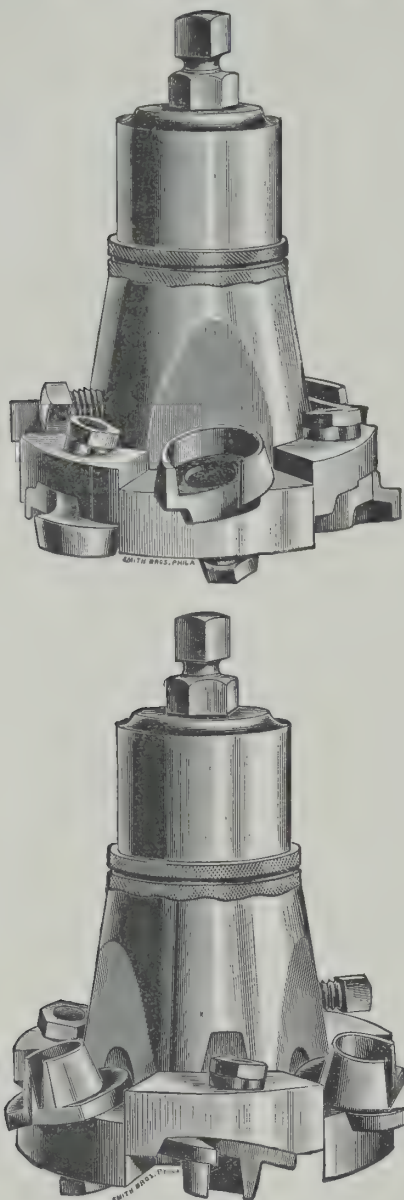


PIPE FENCE IN CENTRAL PARK, NEW YORK, HAVING ANCHOR POSTS.

indefinitely, if the parts above ground are kept painted. The anchor post is manufactured by the Anchor Post Company, 503 Fifth Avenue, New York City, the company also manufacturing a very complete line of wire and metal fencing, for which they have an extended reputation, especially in fences for country residences and parks. In the bit of park landscape shown in one of the views may be seen a very simple and inexpensive form of fence in which this anchor post is employed, the fence being 20 inches high, and only two rows of pipe being employed, although the travel and crowd in the neighborhood is sometimes very large.

HARDWOOD MATCHING HEADS.

The illustration represents improved tools for matching flooring and ceiling, in which adjustments for tight and loose matching are quickly made, without taking heads off the spindle. They are manufactured by Samuel J. Shimer & Sons, of Milton, Pa. The heads are made

**THE "SHIMER" EXPANSION MATCHER HEADS.**

in sections, the inner section having three radial projections, which carry the upper series of bits, and is bored to fit matcher spindles, carrying also the top screw that regulates the permanent line of cut. The outer section fits over the inner one, and has also three projections, interlocking with those on the inner section, and carrying the lower adjustable series of bits. The cut of the bits in the several series must overlap on the dividing line, but must not overlap the clearance cut of the bits in the opposite series, the adjustment being made a fixture, and limited so that the broad sections cannot be set out of working adjustment. The expansion principle, as applied to these matcher heads, does not interfere with the top screw adjustment, which, when once set, carries the head in line of cut for all time. The interlocking sections have a line mark in common cut into their seats when the head sections are set for regular matching, and any change made by moving the lock nut will register between these lines.

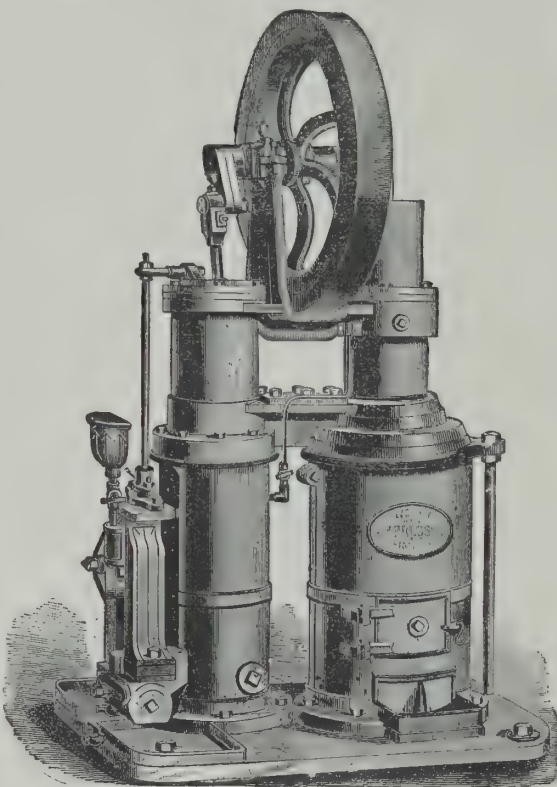
Porcelite.

This is the name of an enamel finish producing a hard, washable, glossy, impervious, durable, porcelain-like surface on wood, plaster, brick and metal. The variety of places in which it may be advantageously applied is almost without limit, and it has been employed most liberally in the more recently erected and most sumptuously fitted up buildings, such as the Waldorf, the Albemarle, the Imperial, and the Netherland hotels, of New York City. Water, soap, steam and acids have no effect upon it. It is manufactured by the Thomson Wood Finishing Co., of Philadelphia, Pa., and painters and decorators should not neglect to inform themselves of the advantages afforded by this material. It flows even, works free under the brush, does not show laps or brushmarks, and can be rubbed or polished. It dries perfectly hard by oxidation, will not blister or peel, and will not soften by heat or become tacky under any condition. It dries by the absorption of oxygen and attains a permanent hardness. Its peculiar drying qualities being secured, the thorough permanency of gloss and elasticity is maintained. It sets in about an hour, and dries sufficiently for the second coat in thirty hours, being ready for rubbing and

polishing in about sixty hours. It can be applied over old paint and whitewash, first rubbing and sandpapering down the surface to remove loose particles, and may be laid out in imitation of tiles and enamel brick. It is claimed to have much greater covering properties than pure linseed oil paint, one gallon being said to be sufficient for three coats on about twenty square yards. It is furnished ground to an almost palpable fineness ready for use, and tube colors or pure colors ground fine in Japan mix with it readily, producing any desired color, although it is made by the manufacturers in a variety of permanent, durable and handsome tints that do not fade or change color.

THE RIDER ENGINES.

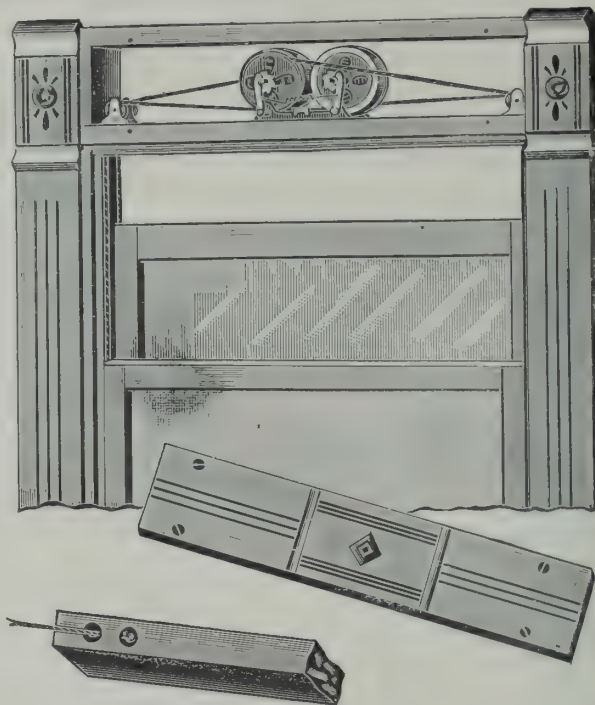
For country residences these engines afford a machine that can be run by any ignorant person, or they will give no trouble to an owner who has no special knowledge of machinery. They are manufactured by the Rider Engine Co., of No. 37 Dey Street, New York, in their own shops, on the interchangeable plan, so that any repair part will fit perfectly, and may be supplied without delay, but the

**THE RIDER HOT AIR PUMPING ENGINE.**

company can refer intending purchasers to engines sold as far back as 1875 to 1882, and still in use. Some com-

THE SECURITY SASH BALANCE.

This is a balance which requires no pockets or pulleys in the pulley stiles, and which will exactly balance a sash at any point, working without a friction screw. It requires no space between the window frame and studding, allowing the plaster to be joined closely to the

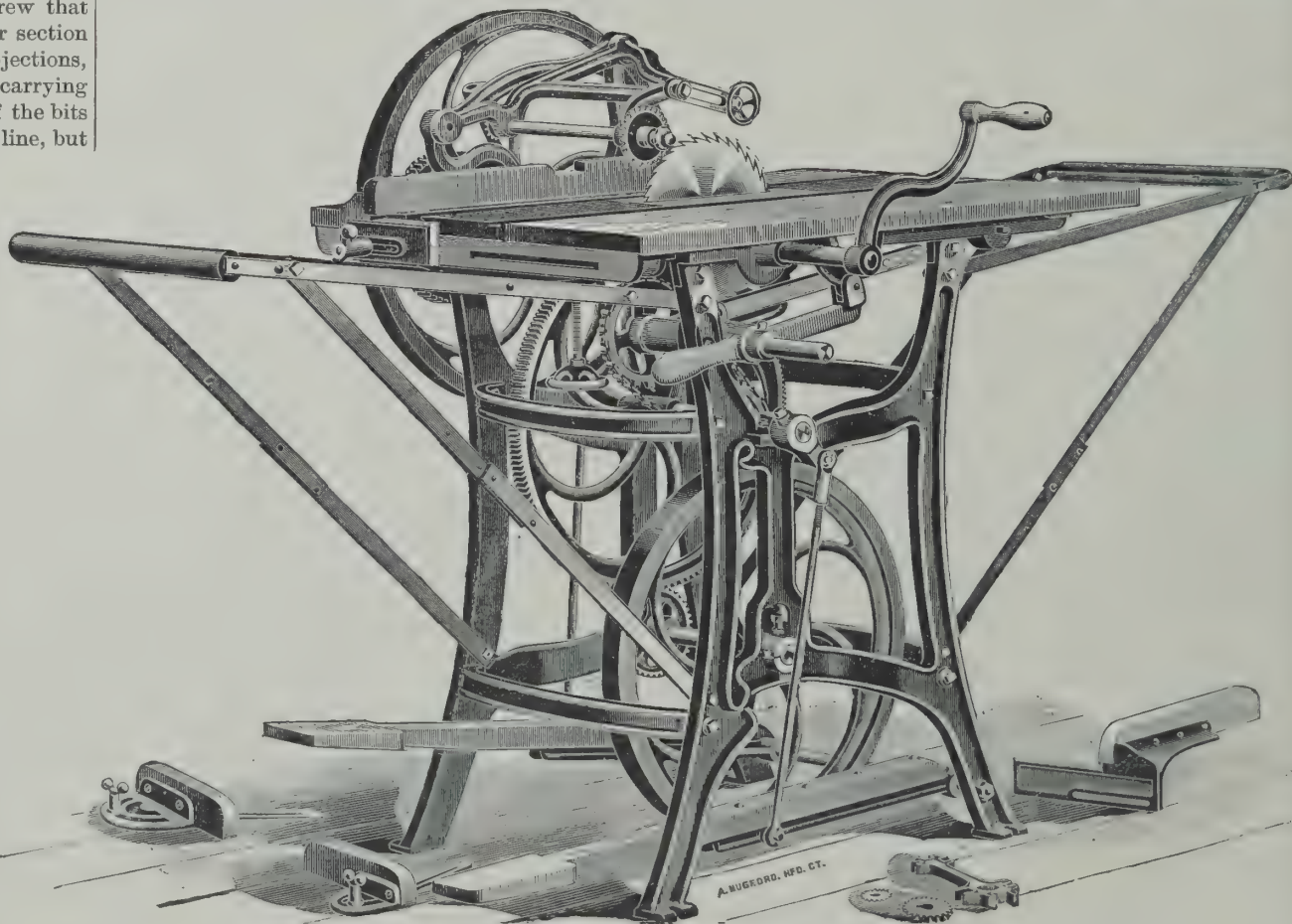


frame, while the frame may be nailed firmly to the studding, so that the frames cost less where this balance is used. It is placed on the centre of the window head, and when the window is finished it is entirely inclosed, out of sight, free from dust. It can be made strong or weak by the use of a key, and there is but one cord to each sash. It is noiseless, simple and efficient. The manufacturers are the Richmond Safety Gate Company, Richmond, Ind.

It is said that dew will not form on some colors. While a yellow board will be covered with dew, a red or black one beside it will be perfectly dry.

IMPROVED WOODWORKING MACHINERY.

The machine shown in the illustration is a comparatively light one for the wide range of work it is adapted to perform, but is of the latest and most approved construction, and of ample strength. It is manufactured by the Seneca Falls Mfg. Co., No. 276 Water Street, Seneca Falls, N. Y., and may be operated either by hand or foot power. It will rip stuff up to 3½ inches thick, and will

**A COMBINATION SELF-FEED RIP AND CROSS-CUT SAW.**

paratively recent improvements have, however, been introduced, and the company claim to be now producing an engine which is more nearly perfect than any domestic pumping appliance on the market. Unlike windmills, they are always to be depended upon, while the windmill is frequently stopped in the summer time, from insufficient wind, when the water supply of a country house is most needed. More than ten thousand of these engines are in use.

cross-cut, mitre, rabbet, dado, groove, edge up, etc., and has extra attachments for boring, edge moulding, beading, etc. The table is 28 x 36 inches, with extension rolls, and four changes of speed are provided for, and three of feed, the change from self-feed rip to a cross-cutting machine being quickly effected. The No. 15 A catalogue, issued by the company describing a full line of their foot and hand power woodworking machinery, will be sent upon application.

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THE YONKERS PUBLIC SCHOOL HOUSE No. 8.—See page 71.

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A. E. BEACH.

NEW YORK, MAY, 1895.

THE

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A HOUSE AT GLEN RIDGE, N. J.

The subject of illustration in colors on our front page cover is a dwelling at Glen Ridge, N. J., in the Colonial style, recently erected for Whitmell T. Taliaferro, Esq. The floor plans will be found on page 79. Dimensions: Front, 37 ft.; side, 34 ft. on the first floor; 25 ft. above. Heights: Cellar, 7 ft.; first story, 9 ft.; second, 9 ft.; attic, 8 ft. Underpinning of local stone. Exterior framework above sheathed, papered, clapboarded and painted dark gray. Roof and dormers shingled, and left to weather. Trimming color, white; blinds, dark gray. The features of the design are its entrance porch, with four Tuscan columns supporting balcony, having goosenecked rail, which is also used on roof deck. The central grouping of windows, as well as entrance door and side lights, are very effectively divided by wooden muntons. The plan is the usual Colonial arrangement of rooms: central hall, with walls of sand finish plaster, light yellow in color, with frieze and ceiling gray, trim painted white. Stairs, the same, with square balusters and turned newel rail, being of mahogany. Dining-room in cherry; fireplace tiled with unglazed tile; china closet at angle; plastering is sand finish, and tinted, dado being dark terra cotta, lighter above; frieze and ceiling, light yellow. Butler's pantry, with sink and dressers, connects with kitchen, complete, with usual fixtures, including three washtrays. Parlor, finished white, has angle fireplace in buff brick, with mantel above; walls also finished rough, and tinted yellow; sliding doors connect with library, having similar fireplace, walls being tinted same as dining-room. Second floor plan shows four chambers, principal one having dressing-room, all with closets, neatly provided. Bathroom, with usual fixtures of good make. Attic has three rooms finished off, and storage space. Cellar, cemented, contains heater, fuel storage, etc. Chas. E. Miller, Esq., 258 Broadway, New York, was the architect.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT TENAFLY, N. J.

We give on page 73 a cottage erected for Charles Vogt, Esq., at Tenafly, N. J. The elevations, as shown in the perspectives, are well designed, and the plans show a well arranged interior. The underpinning is built of local rock-faced stone, laid up at random. The first story is clapboarded, and painted olive yellow, with white trimmings, while the second and third stories are shingled, and painted Colonial yellow. Roof shingled, and painted red. Dimensions: Front, 36 ft.; side, 49 ft., not including front piazza. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior throughout is trimmed with white pine, and is finished natural. The hall contains an ornamental staircase, with carved newel. The newel posts at second floor are extended to ceiling, the space between being filled in with spindle-work. The library and dining-room have open fireplaces, trimmed with tiled hearths and facings, and hardwood mantels, with mirrors. The butler's pantry, kitchen, and other pantries are wainscoted with narrow beaded stuff, and furnished with usual fixtures complete. The second floor contains four bedrooms, sewing-room, large closets, and bathroom; the latter is wainscoted, and fitted up replete. There are no rooms finished off on the third floor, but several apartments could be provided, if desired. Cemented cellar contains laundry, furnace, and other necessary apartments. Cost \$5,800 complete. Mr. W. L. Stoddart, architect, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

DWELLING AT KENNEBUNKPORT, ME.

We present on pages 74 and 75 the country house of the Rev. Edward Clark, D.D., at Kennebunkport, Me. The building as now completed is one of the most picturesque residences along the coast, and it has many artistic features, including the terrace garden, which is a novel idea, giving a privacy to the building, and at the same time a place for a quiet rest. It is built of shore rocks, selected from the coast by the proprietor, and are very beautiful in color, showing fine tones in reds, browns, blues, and yellows. The exterior walls of wood are covered with shingles, and left to weather finish. The roofs are also shingled, and left to finish in a similar manner. Dimensions: Front, 53 ft. 6 in.; side, 58 ft. 6 in., not including terrace and porte cochère. Height of ceilings: Cellar, 8 ft.; first story, 11 ft.; second, 10 ft.; third, 9 ft. The hall, 14x16, and 20 ft. in height, is finished in the Colonial style, and is treated in ivory white. It has a paneled wainscoting around both upper and lower halls, and there are fluted pilasters supporting beams, with carved capitals. The ceiling of this hall is paneled with moulded strips, with carved bases. The wall between the paneled and ceiling ribs is painted a light salmon color, and from the centre of this ceiling is suspended a wrought iron chandelier, with other brackets of similar metal, and very artistic in design. The staircase is built with twisted balusters, posts, and a mahogany rail. The drawing-rooms are treated with ivory white in a most exquisite manner. The colonnade effect between the drawing-

rooms is a pleasing feature, it being composed of archway and columns of a classic order. The ceiling is paneled and beamed, with carved brackets under the beams. The fireplace is built of long Perth Amboy bricks, with a massive carved mantel. The dining-room is trimmed with oak; it has a paneled wainscot, ceiling beams, and a buffet built in, with leaded glass doors, and a refrigerator under same, with an opening in kitchen for ice, etc. The fireplace is an English grate, ornamented iron and tiled facings, and a carved mantel. There is a large amount of elaborate carving in this room and the other apartments, which has been done by the owner, Dr. Clark, and has been very much admired. Dr. Clark is famous for his beautiful wood-carving, and as a result of his pastime is the balcony and pulpit of the Church of the Puritans, 130th Street, this city, which he carved while rector, and which is the best example of wood-carving of its class in this country. The library is treated in cream white, and is fitted up with paneled wainscot, ceiling ribs, bookcases built in, and an opening out upon the terrace garden. Kitchen, maids' dining hall, and pantries are trimmed and wainscoted with white pine, finished natural. These apartments are furnished with the usual fixtures complete. All window jambs are paneled below window seats and back of same. These window seats occur throughout. The floors are laid with oak, and are wax finished. The bedrooms are finished with white pine, and are treated in colors and some stained work. There are four bedrooms, study, eight closets and bathroom, while the third floor contains the maid's bedroom, store and trunk rooms, and tower room, which is used as a studio. Bathroom is wainscoted and paved with tiles, and is fitted up with exposed plumbing. The cellar contains laundry, furnace, other necessary apartments, and a large cistern, from which the water is pumped into the tank on third floor, and thence supplying the house. The stable is built in keeping with the house, and is connected by a covered way. Mr. Henry Paston Clark, architect, Studio Building, Boston, Mass.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A LOG CABIN CHAPEL.

We illustrate, on page 77, a unique little chapel, St. Mary's-by-the-sea, which has been erected recently at Black Rock, Conn., through the untiring efforts of Thomas W. Pearsall, Esq. The design is in keeping throughout in its own peculiar style of a modern log cabin church, and it was erected in the very short space of five weeks. It is built of polished spruce logs brought from Northern New Hampshire; those in the eastern wall come by special train, being cut, transported, and set in place, all in the incredibly short time of four days, probably the quickest transportation of this kind ever made. The logs are so fitted together that no filling is required, but, being planed on both sides, lie so closely together that they form a solid wall, which does not even admit the wind, while their dark sides, stained to show the grain, present a strikingly novel interior effect. The small tapering tower and roof are covered with shingles and left to weather finish. The interior is wainscoted with narrow beaded oak, and the ceiling is ceiled with similar oak. The auditorium has a seating capacity of one hundred. The pews and altar furnishings are of oak. The chancel is lighted by a stained glass window showing the Crown of Glory. The choir and organ is at the left of chancel, and the vestry at the right, with an outside entrance thereto. The windows are glazed with leaded Cathedral glass, of a delicate tint, shedding a soft and pleasant light over the interior. The whole tone of coloring is most excellent. The tower contains four Methuen chimes. Mr. Pearsall deeded the piece of ground on which the chapel stands. He was ably assisted by Jonathan Thorne, Esq., Gen. Thomas L. Watson, Com. Bateman, and ex-President Harrison, who contributed so generously to the building fund that the chapel was dedicated and consecrated at the same time, and then presented to St. John's Parish at Bridgeport, Conn. Mr. Bruce Price, of 150 Fifth Avenue, New York, was the architect.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

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A COTTAGE AT PARK-HILL-ON-HUDSON, N. Y.

We present on page 76 a country house recently erected for George L. Rose, Esq., at Park-Hill-on Hudson, N. Y. The design is well executed, showing many excellent features. The underpinning is built of rock-faced stone, laid up at random. The exterior framework above, of wood, is covered with clapboards and shingles, and painted silver gray. The roof is shingled and left to weather finish. Dimensions: Front, 42 ft.; side, 62 ft., not including piazza. Height of ceilings: Cellar, 8 ft.; first story, 10 ft.; second, 9 ft.; third, 8 ft. The interior is trimmed with cypress and finished natural. The walls are back plastered. The floors are laid with yellow pine in pattern. Vestibule has a floor laid in mosaic. The most novel feature of the hall is the combination hat-rack and mantel, 14 feet in length, with mirrors and rich carving. The fireplace proper is built of brick, with a tiled hearth and facings. The staircase is a grand one, with carved newel posts and a spacious landing with paneled divan. Toilet is conveniently located under this landing. Parlor, library, smoking and dining rooms have octagonal projections and open fireplaces, furnished with tile trimmings and hardwood mantels, made from special designs. Kitchen, laundry and pantries are wainscoted with plaster tiling, and furnished with the best modern fixtures complete. The second floor contains five bedrooms, sewing room, nine closets and bathroom. The bathroom is plaster tiled, and is furnished with the usual fixtures, with exposed plumbing. Third floor contains five bedrooms and trunk room. Cemented cellar contains furnace and other apartments. The windows on first story have stained glass transom, a most admirable feature for a pleasant, soft light and good ventilation. Cost \$12,000 complete. Mr. A. F. Leicht, architect, 103 Cedar Street, New York.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A HOUSE AT ORANGE, N. J.

We present on page 78 a house just finished at Orange, N. J., for Thomas L. Smith, Esq. It is made from a photograph taken specially for the SCIENTIFIC AMERICAN. The house is a very complete one for a moderate priced design, and the stone work and gambrel effect give a very restful and pleasing result. It contains a vestibule, with a seat, a large reception hall, parlor with fireplace, dining-room with ample buffet, and a rear porch; a large complete and well arranged kitchen. The house contains four bedrooms on the second floor, also a large bathroom. These are complete with closets, full square sides, and are well protected from the cold and heat by the double walls. There is one room finished in the attic. The house was built from the plans and under the supervision of Child & De Goll, architects, 62 New Street, New York.

THE YONKERS PUBLIC SCHOOL NO. 8.

The engraving on page 69 and plans on page 80 illustrate a school building erected by the Yonkers Public School Branch of Education at Armour Villa Park, Bronxville, N. Y. It presents a good example of school architecture of a thoroughly substantial character. It is built of North Haven brick, laid up in red mortar, with red sandstone trimmings. The roof is slated. The plans show schoolrooms well arranged for light and ventilation. The boys' and girls' coat rooms are separated and are conveniently located. The interior throughout is trimmed with whitewood and finished natural. The apartments are wainscoted with narrow beaded stuff. The floors are laid with yellow pine and oiled. The principal office opens out upon stair landing. The cemented cellar contains furnace and play rooms, besides other necessary apartments.

Our engravings were made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A DWELLING AT MONTCLAIR, N. J.

We publish on page 81 a dwelling of modern design, recently erected for M. Strong, Esq., at Montclair, N. J. The lines of the building are well broken by many good features. The underpinning is built of rock-faced gray stone from the Glen Ridge quarries, laid up at random in red mortar. The exterior framework is sheathed with matched henlock boards, laid on diagonally. The first story is clapboarded, and the second and third stories are shingled. It is painted French gray, with trimming of a lighter color. The roof is shingled and finished natural. Dimensions: Front, 39 ft. 6 in.; side, 39 ft. 6 in., not including piazza and porch. Height of ceilings: Cellar, 7 ft.; first story, 9 ft.; second, 8 ft. 6 in.; third, 8 ft. The interior is arranged in a most convenient manner, and is handsomely finished. The vestibule and hall are trimmed with quartered oak, and each have parquet floors in oak. The hall contains an ornamental staircase, turned out of similar wood. This hall is lighted effectively by stained glass windows on either side of entrance door. The remainder of the house is trimmed with whitewood and finished natural, with the exception of parlor, which is treated in ivory white. The latter is provided with an open fireplace, furnished with tiles, and a neat wood mantel, with columns and mirror. Library and dining-room are separated by double sliding doors, and

each have fireplaces built of brick, with tiled trimmings and hardwood mantels. Kitchen and pantries are wainscoted with narrow beaded stuff, and are furnished with the usual fixtures complete. The large closets and pantries are the principal features of this apartment. The second floor contains four bedrooms, den, and bathroom. Bathroom has a wainscoting and a floor of Georgia pine, finished with hard oil, and it is fitted up replete. There are three bedrooms and trunk room on third floor. Cemented cellar contains furnace and other necessary apartments. Cost, \$6,000 complete. Mr. Christopher Meyers, architect, 361 Broadway, New York City, N. Y.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A HOUSE AT INDIANA, PA.

On page 82 we illustrate the residence of Mrs. Dr. Thos. St. Clair, at Indiana, Pa. Dimensions: Front, 38 ft. side, 36 ft., not including veranda and porches. Heights: Cellar, 6 ft. 6 in.; first story, 10 ft.; second story, 9 ft.; attic, 8 ft. Foundation walls are of field stone, and finished above the grade line in rock-faced work in regular courses, and pointed in red mortar. Exterior is sheathed with $\frac{3}{8}$ in. mill matched sheathing boards, and covered with "Empire" sheathing paper. First story to the window cornice is weather boarded with one-half V boarding, $4\frac{1}{2}$ in. to the weather. Balance of walls is weather boarded with boards in imitation of narrow clapboarding. Front gables are shingled with cut shingles. Front porch is wide and has clustered Tuscan columns. Roof is sheathed and papered, and covered with "Pennsylvania slate." Exterior is painted Colonial yellow, with white trimmings and apple green sash. First floor contains vestibule; hall, with an ornamental staircase of oak; and having an open fireplace, with mantel of oak, and having tile facings and hearth, and large mirror, and fitted with natural gas for fuel. On the right of the hall is the parlor, in which there is an open fireplace; large window in front, with plate glass, and transom, with leaded glass. On the left of the hall is the library, in which is an open fireplace, which is fitted with a hardwood mantel, tile hearth and facings, and beveled mirrors, and fitted with natural gas for fuel. Adjoining the library is the dining-room, which also connects direct with the hall, and with the kitchen through the rear hall, in which are the stairs to cellar and back stairs to second floor, and communicates with pantry through the china cupboard; kitchen has cupboard, sink, etc., and connects direct with pantry, which has the usual fittings. Second floor contains good sized hall, and opening from the hall are four good sized bed chambers and bathroom, attic stairs and back stairs to first floor. Each chamber has a large closet, while opening into one is the linen closet, and in the same room is an open fireplace, which is fitted with a slate mantel and gas fire; the whole house being heated by natural gas, also lighted by natural gas. Bathroom is wainscoted with $\frac{3}{8}$ in. beaded oak and yellow pine ceiling boards alternately, and is fitted with the usual plumbing fixtures, with hot and cold water. Attic contains two large finished rooms and large storage room. Cellar is not divided. House is plastered with King's Windsor cement. Hall, parlor, library and dining-room are finished with red oak, balance of house is finished in white pine, all

A RESIDENCE AT MONTCLAIR, N. J.

We present on page 72 a very attractive residence, which has been erected for Frederick S. Gage, Esq., at Montclair, N. J. The whole treatment of the design is in the Colonial style. It has several circular and octagonal projections, beaded windows, and a spacious piazza, which go to carry out the antique effect so successfully sought. The underpinning is built of local trap-rock stone, rock faced, and laid up at random. The superstructure above is built of wood, and then covered with cypress shingles, and left to weather finish a natural mahogany color. The roof is shingled and left to finish similar. Dimensions: Front, 46 ft.; side, 39 ft. 6 in., not including piazza. Height of ceilings: Cellar, 7 ft. 6 in.; first story, 9 ft. 6 in.; second, 8 ft. 6 in.; third, 8 ft. Cemented cellar under the whole of the building contains laundry, cold storage, furnace and other necessary apartments, the two former having a raised floor on 2 in. x 4 in. sleepers. The walls and ceilings of these two latter are lathed and rough plastered. The main hall is a unique apartment. It has an ornamental staircase, with columns extending to ceiling, forming an arcaded effect. The woodwork in this hall and parlor is treated with white enamel in a delicate manner. The fireplace in the latter is built of a mottled brick, with hearth and facings of same, and a mantel shelf of Colonial style. The library is trimmed with whitewood, and it contains a similar fireplace. The colonnade effect between this room and dining-room is one of the attractive features. Dining-room is trimmed with oak. It has ceiling beams forming deep panels, paneled divan, and is lighted by a stained glass window with good effect. Kitchen and pantries are trimmed and wainscoted with white pine, finished natural, and each apartment is fitted up with the usual fixtures respectively. The second floor contains four bedrooms, sewing room, large closets and bathroom. This floor is trimmed with white pine, finished natural. Bathroom is wainscoted with oak, and fitted up with porcelain tubs and exposed nickelplated plumbing. The fireplaces are trimmed with tiles, and provided with mantels of excellent design. The third floor contains open hall, two bedrooms, store room and trunk room. This floor is also trimmed with white pine. Mr. Effingham R. North, architect, Park Avenue, Montclair, N. J.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

CAPISTRANO STATION, CALIFORNIA.

That railway corporations as well as railway men are not altogether devoid of sentiment is attested by the construction of a station at Capistrano, on the Southern California road, a good illustration of which is shown herewith. This station in its exterior is a reproduction of the old Spanish mission located at that point, the site for which was selected on the first of November, 1776. The new station, which is built closely adjacent to the site of the old mission building, follows it not only in form, but is built largely of the material taken from its ruins, while the timbers in the roof and a large portion of the flooring were brought from the Todos Santos mission at a cost fully equal to

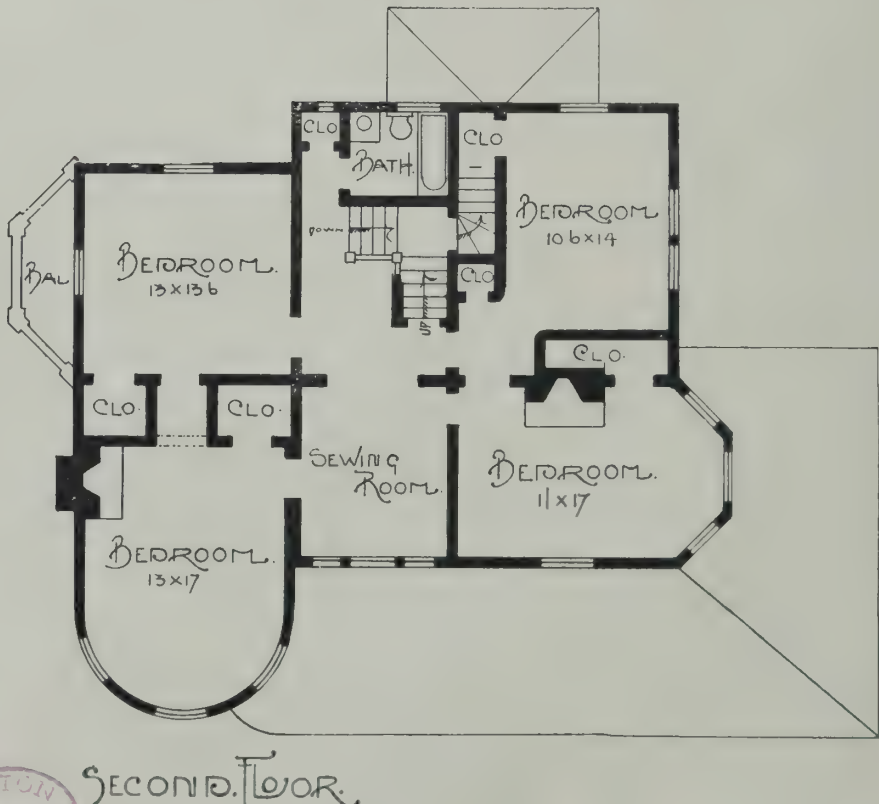
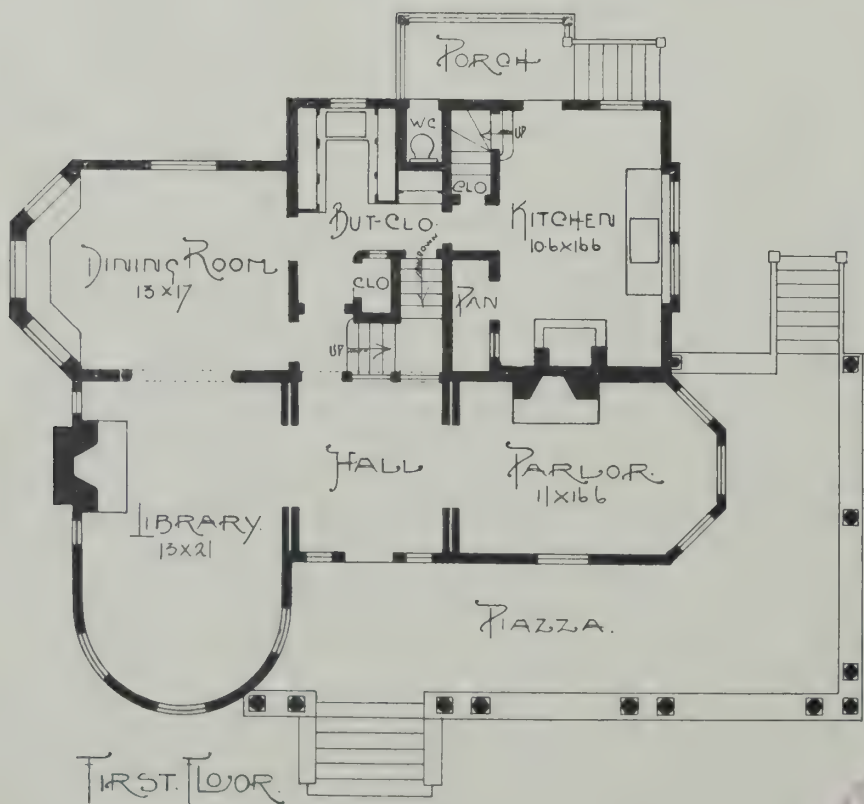
**CAPISTRANO STATION SOUTHERN CALIFORNIA RAILROAD.**

finished natural; sliding blinds throughout. One of the fine features of this design is the liberal use of sliding doors, and the goodly amount of space for furniture. Stairway window is large, and is filled with leaded glass. Parlor and chamber above have open fireplaces, but at present are not fitted with mantels. The house was built, including plumbing, gas fitting, blinds, mantels, etc., complete for \$3,100. Architect and builder, Mr. E. M. Lockard, of Indiana, Pa.

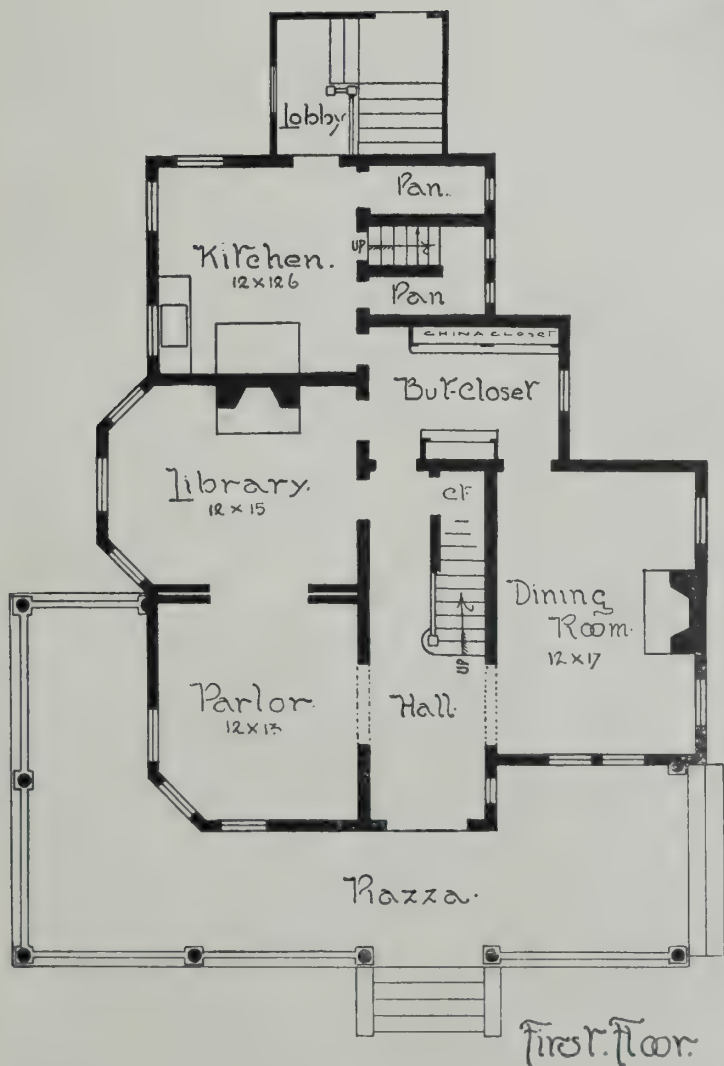
Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

that of new timber, so that the new building will possess a historic value much beyond that of an ordinary station.

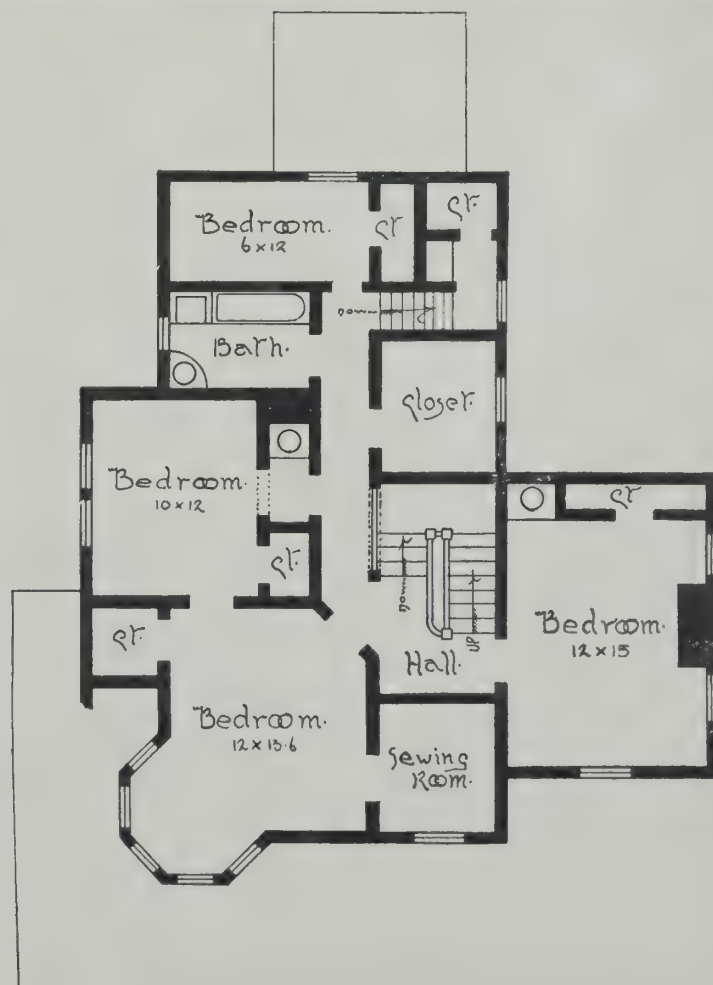
This station was opened to the public on October 22, 1894. There were present on the occasion General Manager Wade and several other of the officials of the road, together with many prominent citizens of Los Angeles and San Diego. The enterprise of the management of the road in thus preserving the ancient landmarks is to be commended, and cannot fail of bringing them closely in touch with the inhabitants of the country. —*Railway Review.*



A RESIDENCE AT MONTCLAIR, N. J.—See page 71.

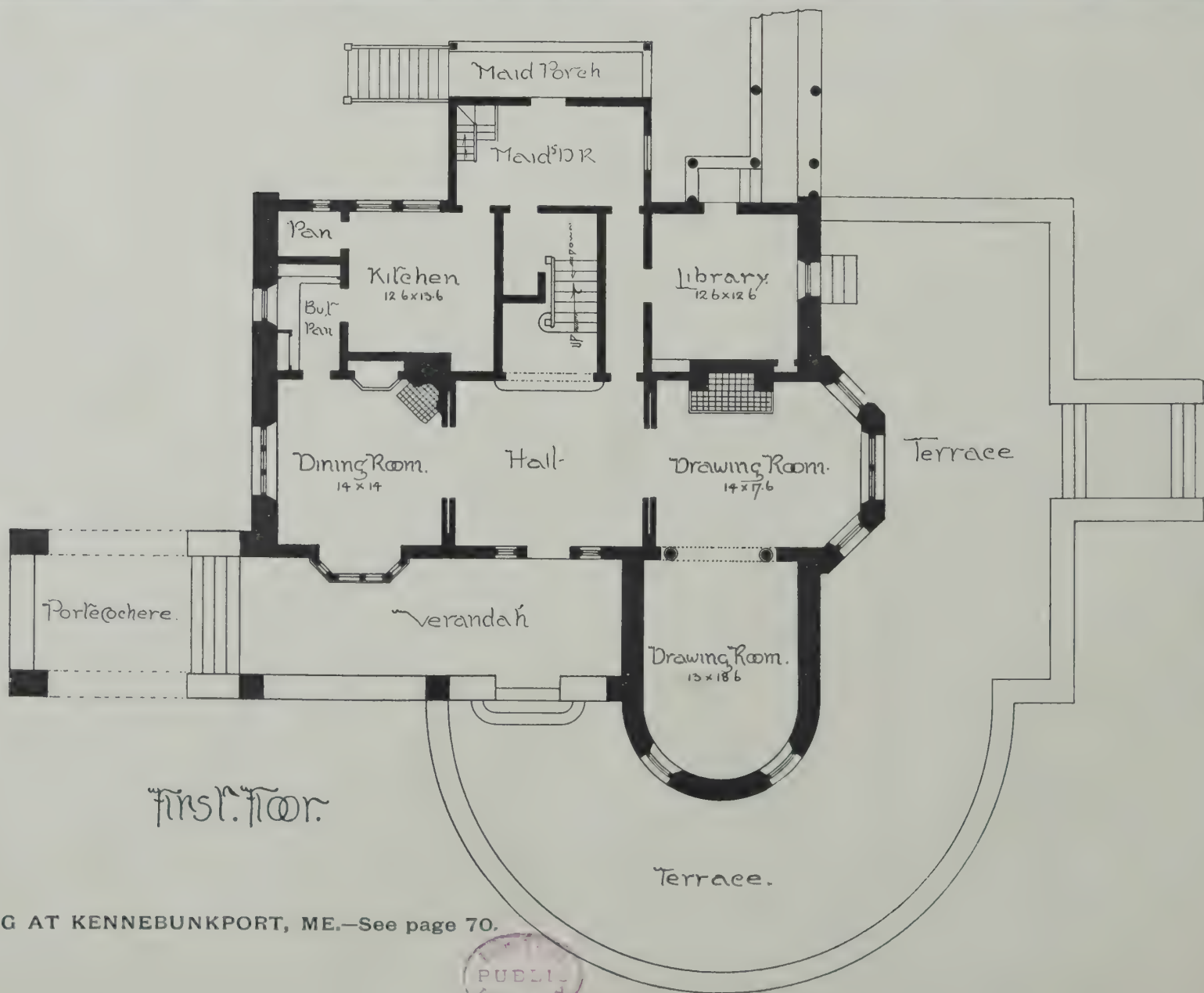


First Floor.



Second Floor.

A COTTAGE AT TENAFLY, N. J.—See page 70.

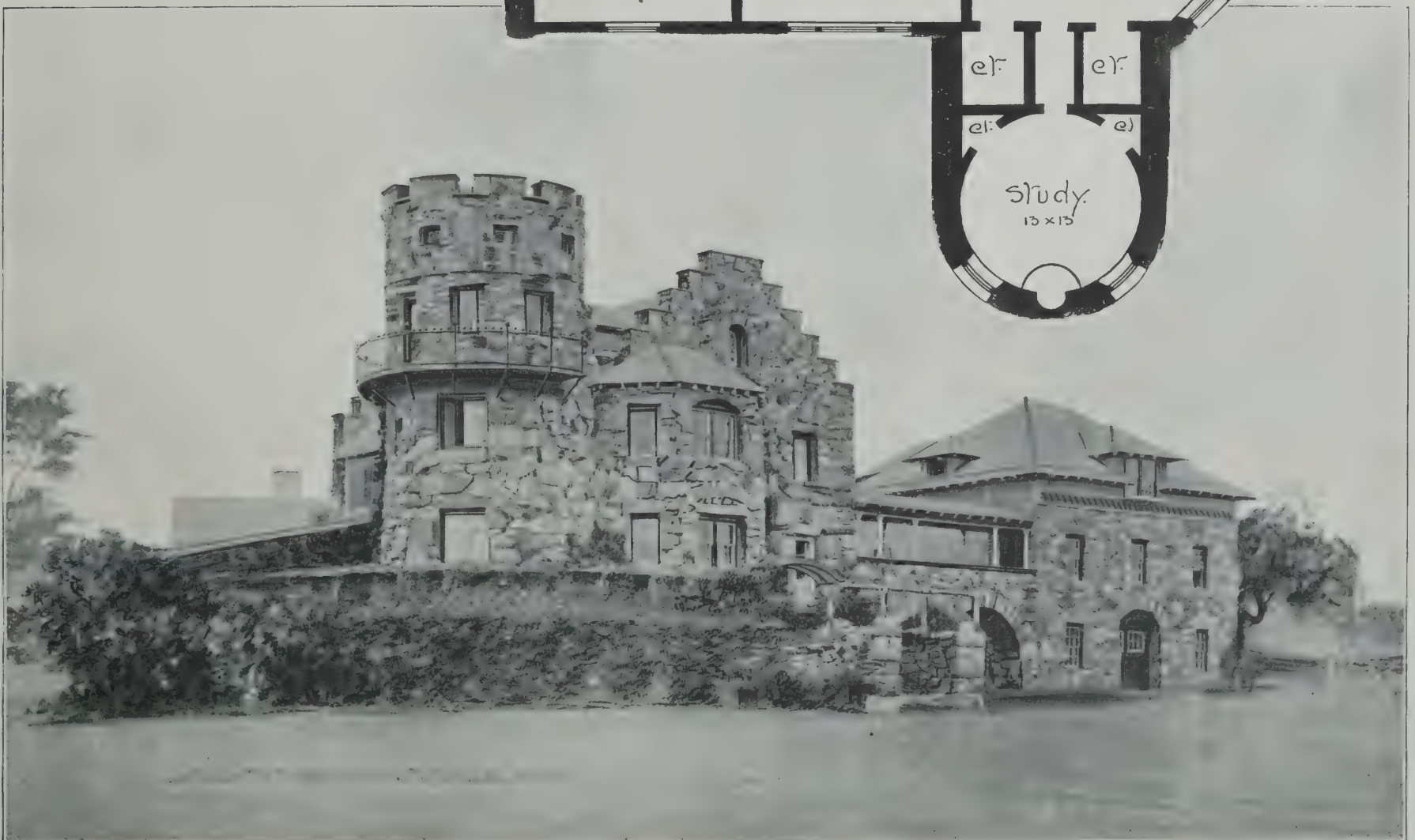


A DWELLING AT KENNEBUNKPORT, ME.—See page 70.

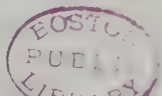


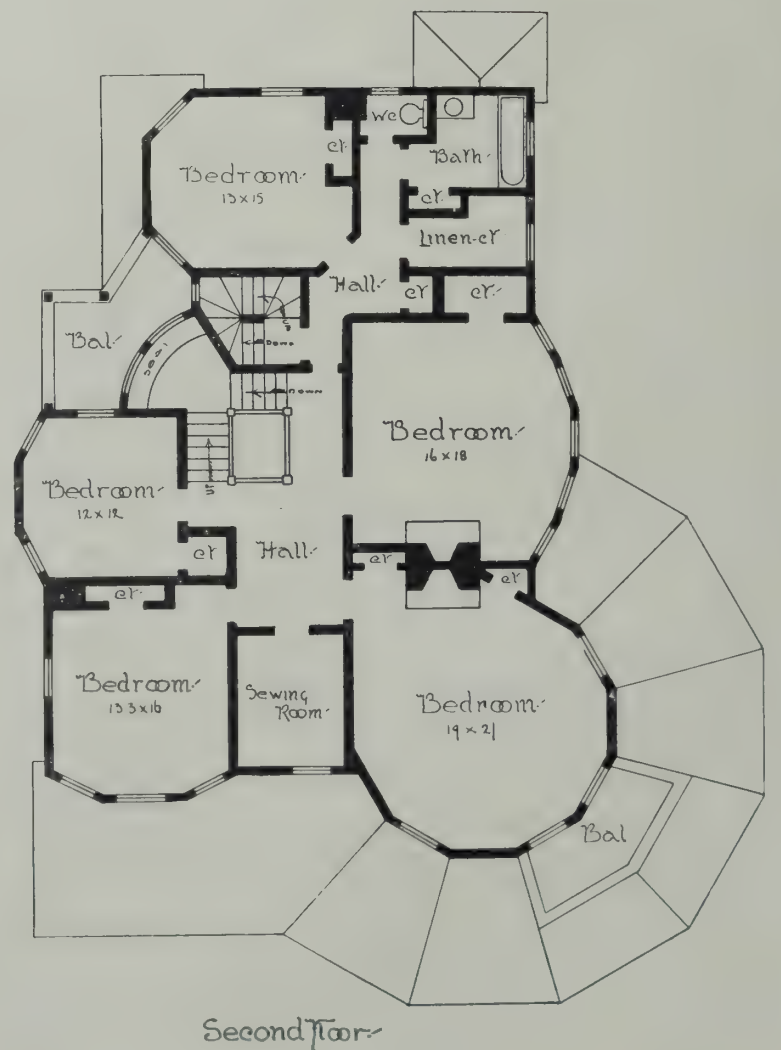


Second floor.

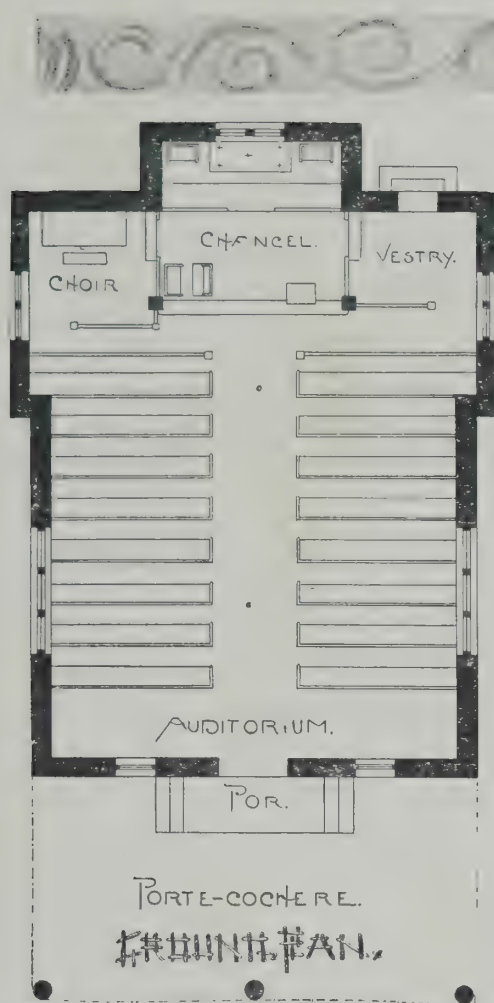


A DWELLING AT KENNEBUNKPORT, ME.—See page 70.

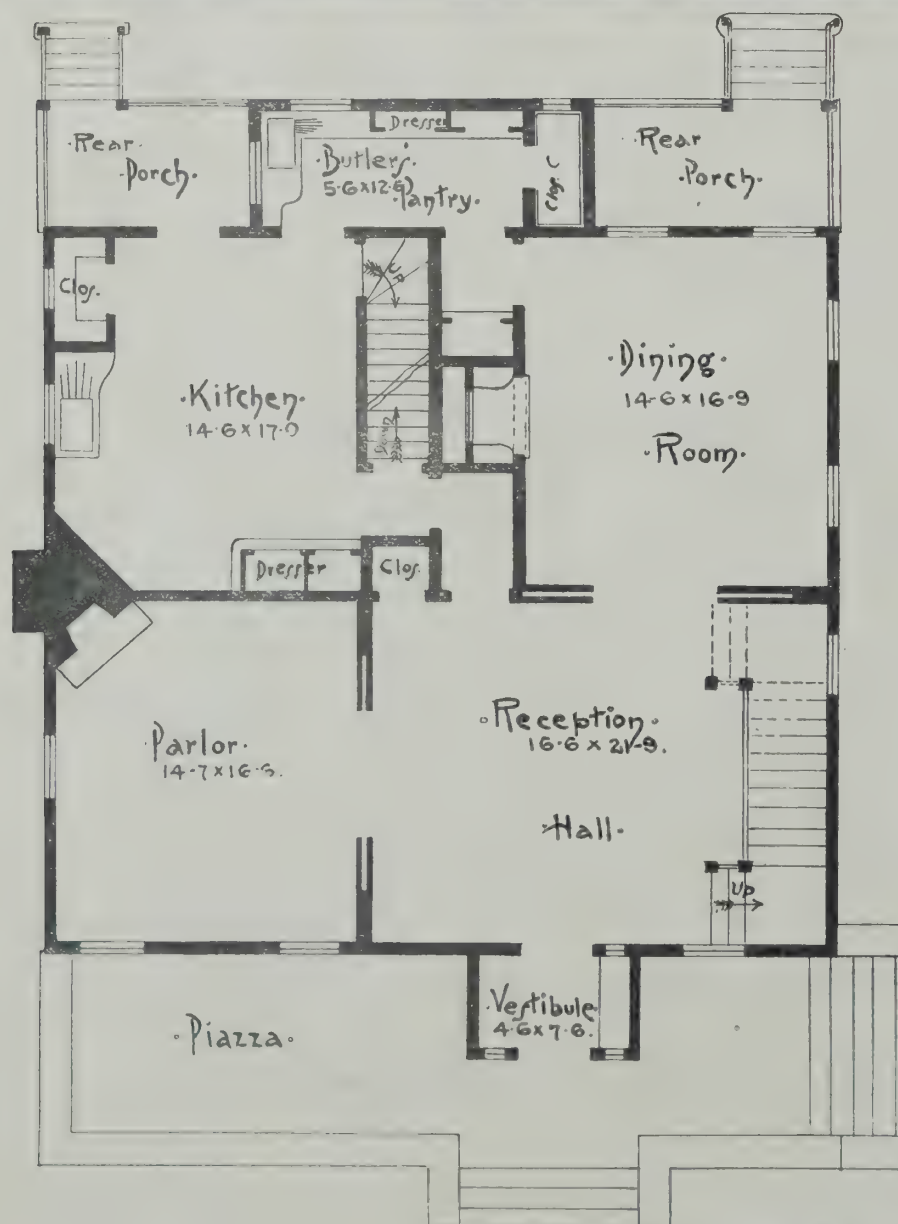




A COTTAGE AT PARK HILL ON HUDSON, N. Y.—See page 71.



A LOG CABIN CHAPEL,—See page 70.



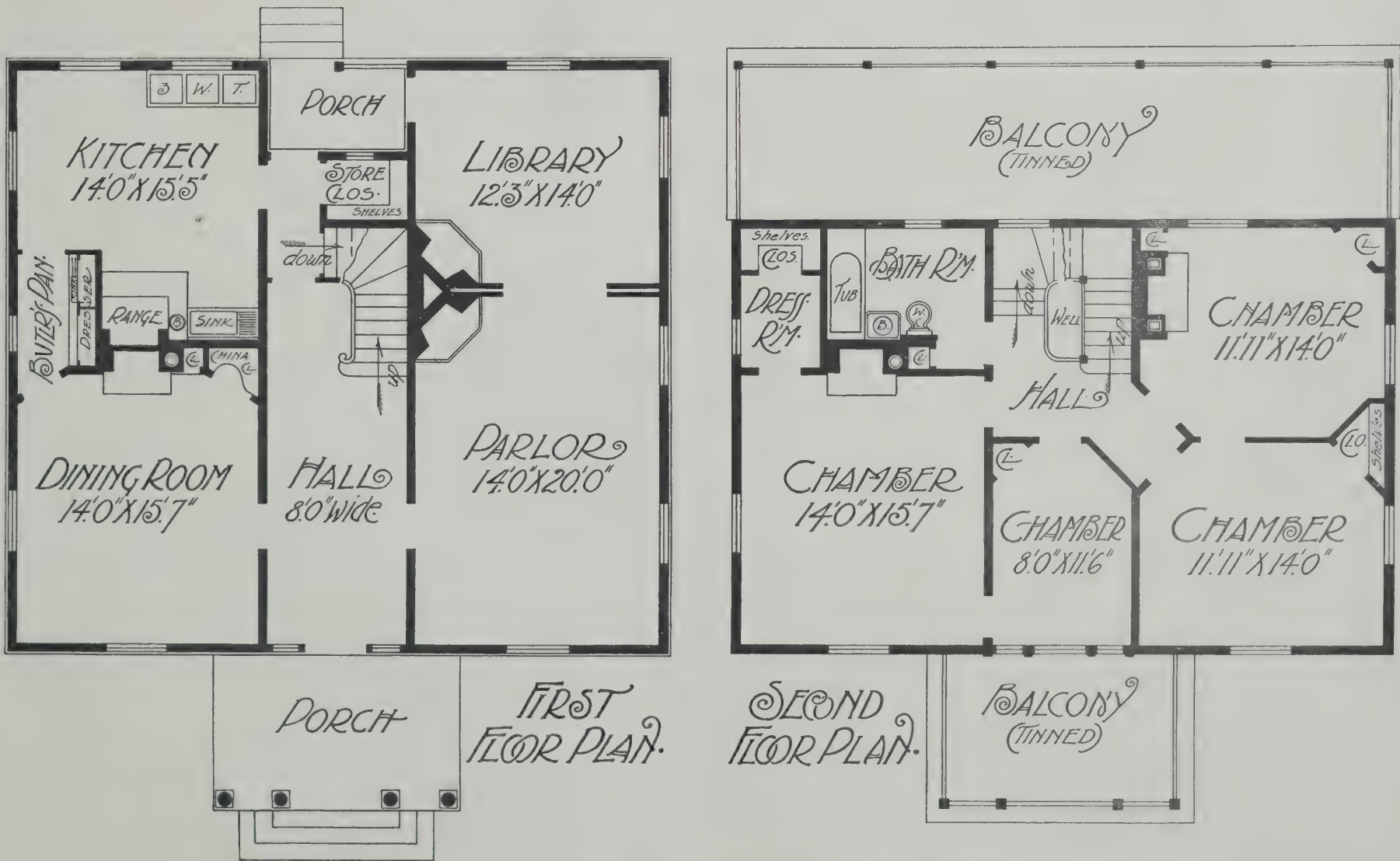
A HOUSE AT ORANGE, N. J.—See page 71.





The Inner Hall

DESIGN FOR A FIREPLACE.—From Moderne Innen-Decoration.

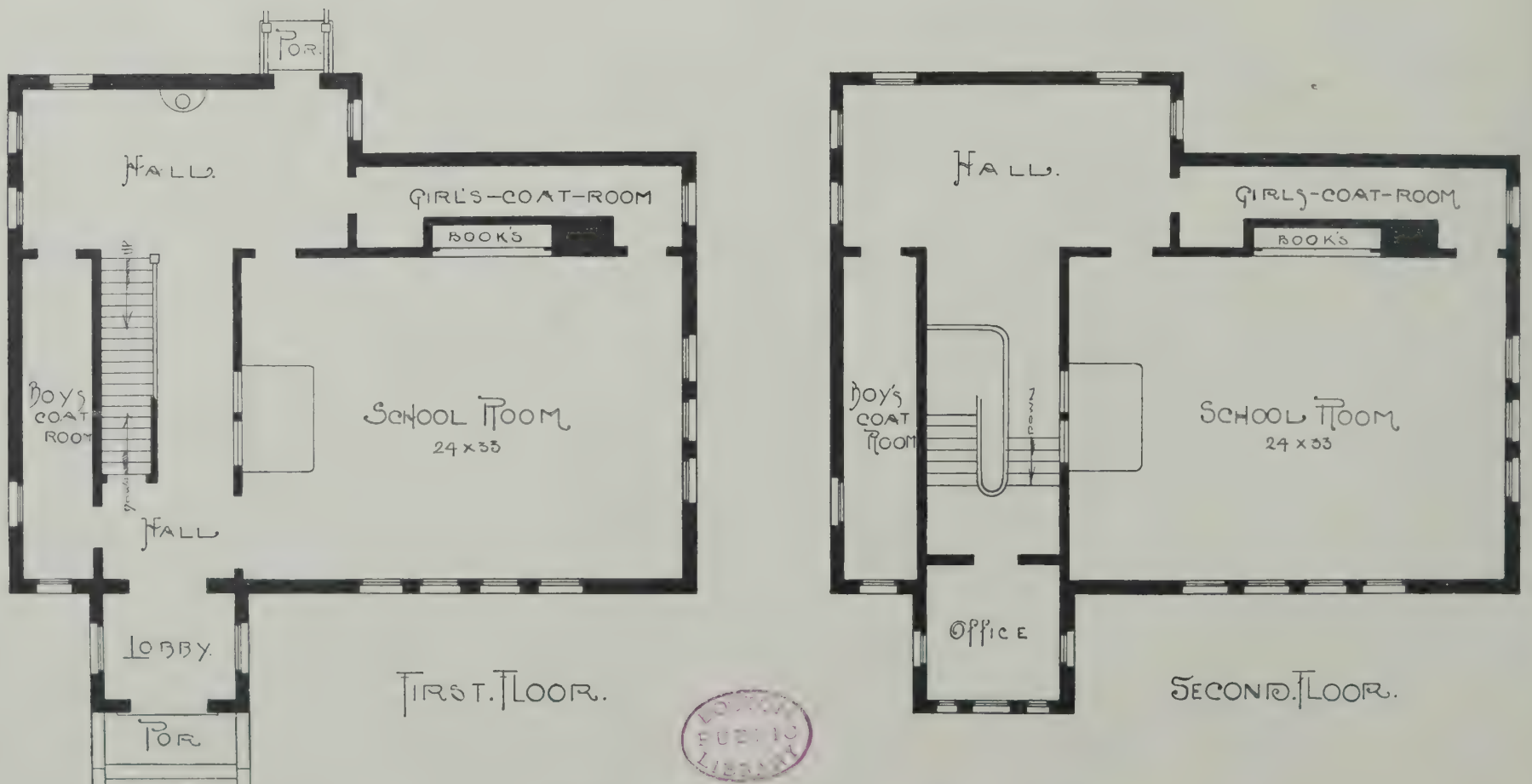


PLAN OF A HOUSE AT GLEN RIDGE, N. J.—See page 70.

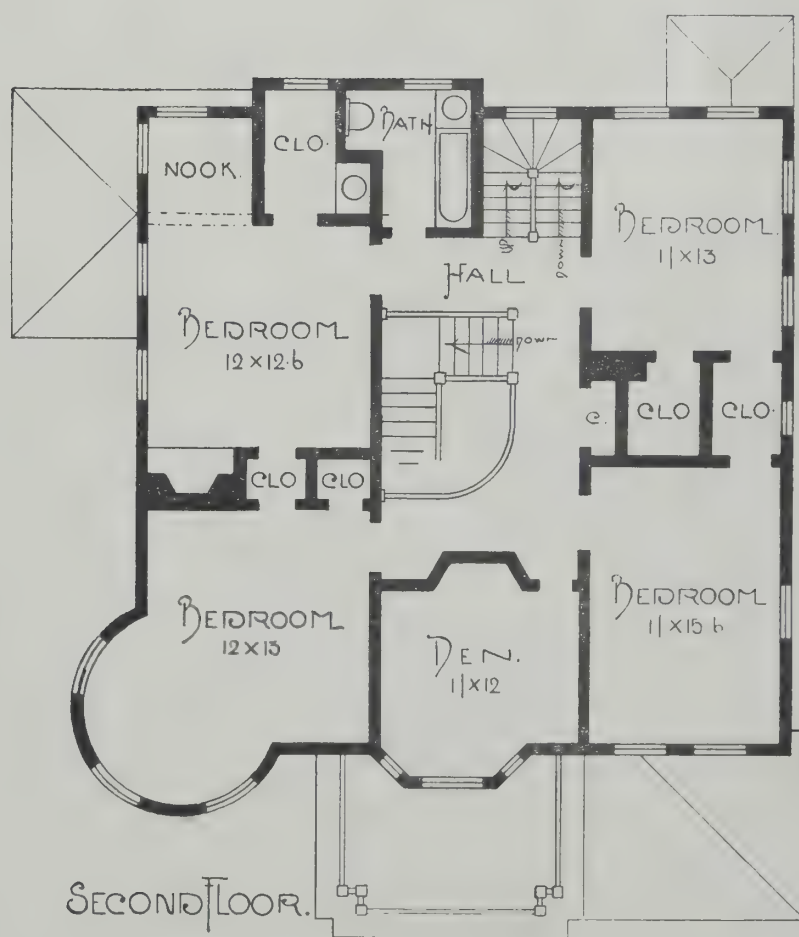
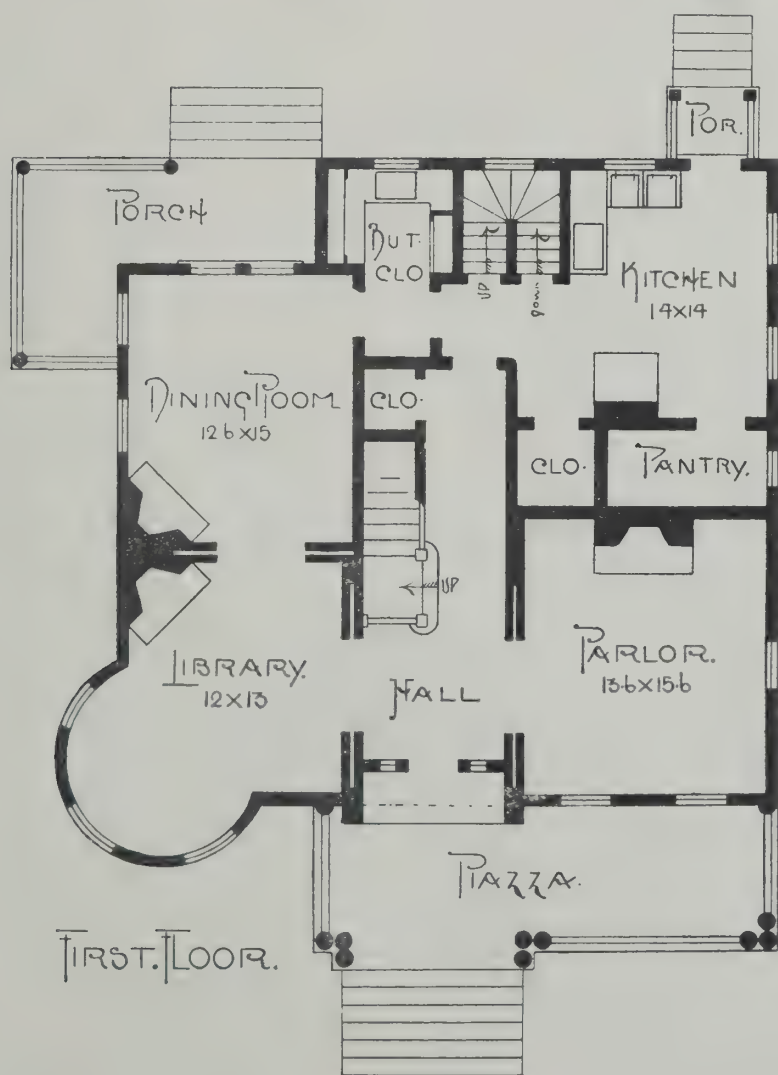




THE BRICK POWER STATION OF THE BROOKLYN CITY RAILROAD COMPANY.—See page 84.

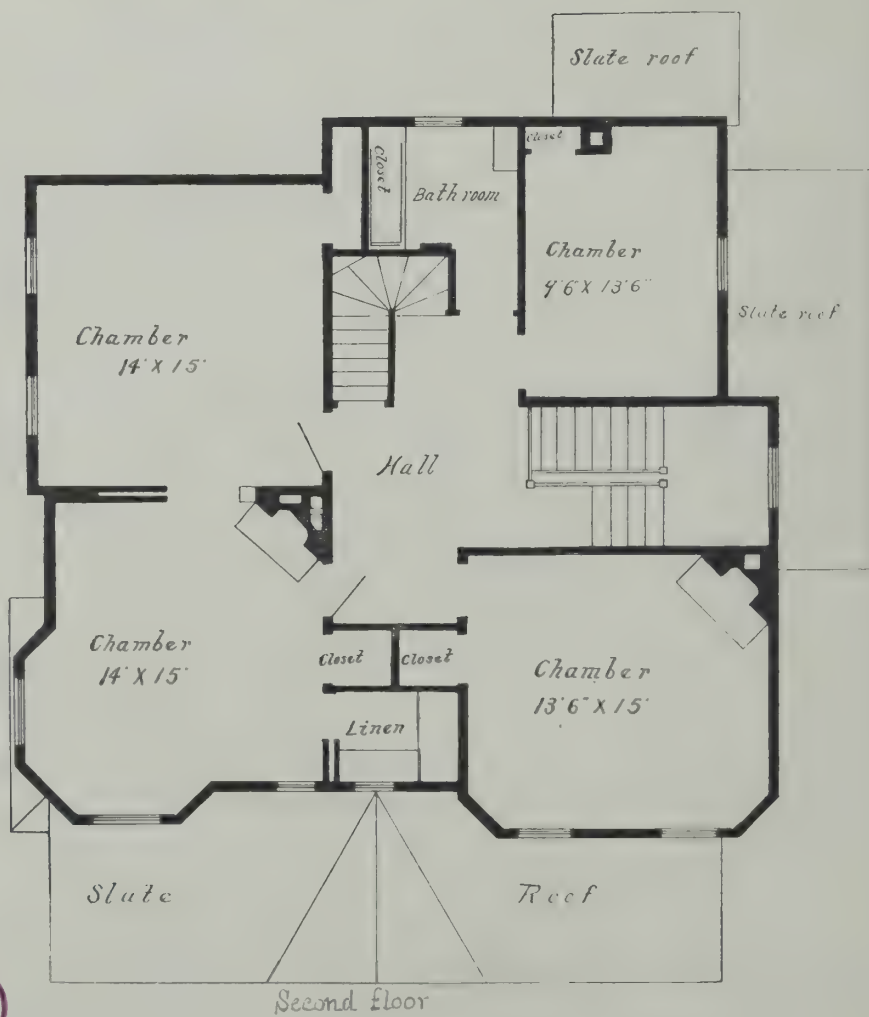
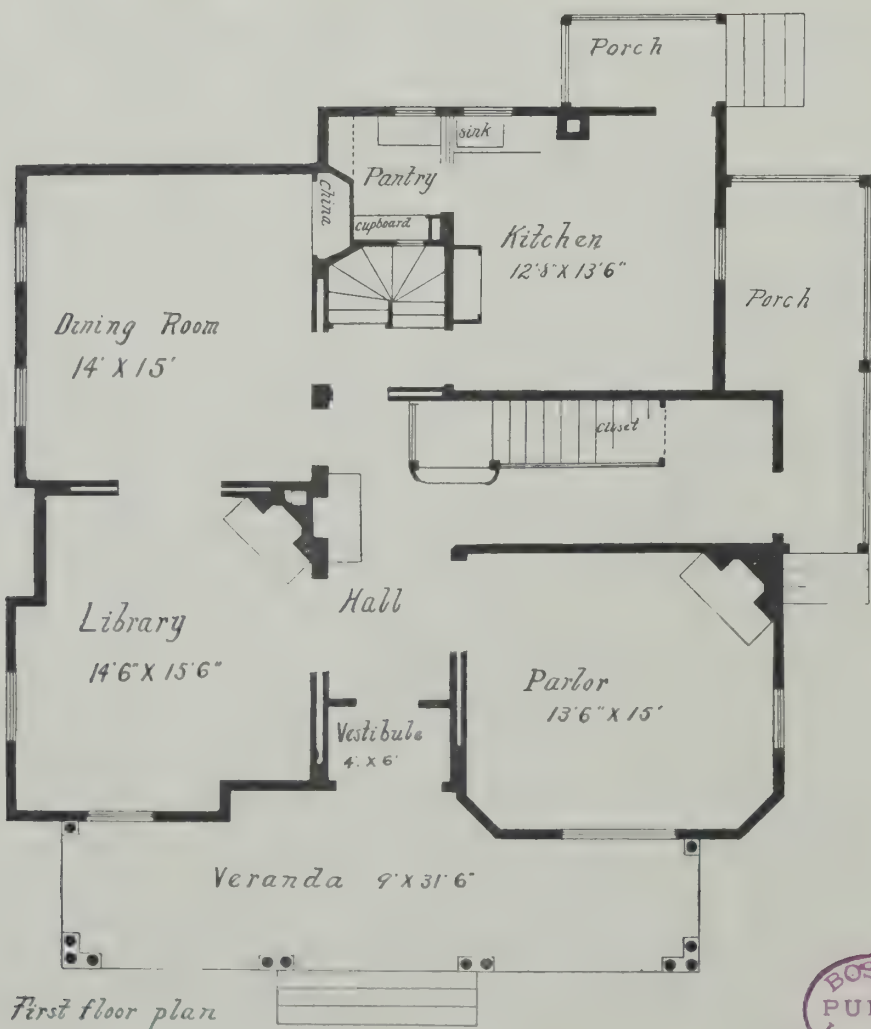


PLAN OF THE YONKERS PUBLIC SCHOOL HOUSE No. 8.—See page 71.



A DWELLING AT MONTCLAIR, N. J.—See page 71.



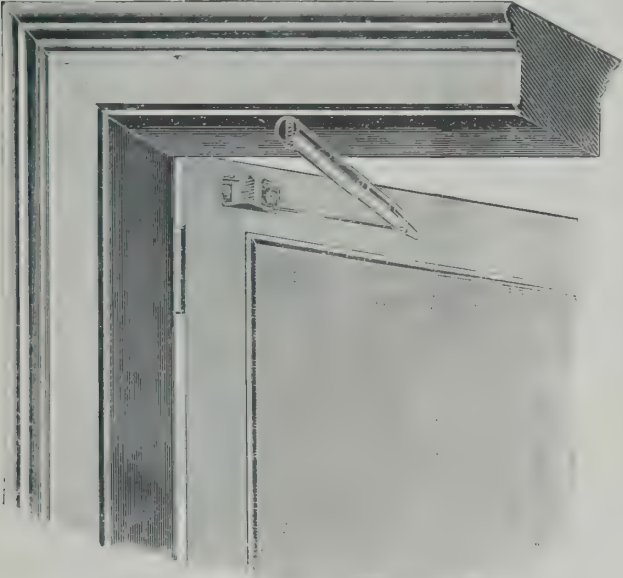


A State Park in the Catskill Mountains.

The New York State Forest Commission has recently made provision for a State park of some 30,000 acres in the heart of the Catskill Mountains. It will be situated in a very beautiful region in the vicinity of Slide Mountain, the highest peak of the entire Catskill range. This is a very populous region, and may readily be reached by the local railroad. The announcement will doubtless be received with great pleasure by the many thousands who make this region their summer home.

TO PREVENT THE SLAMMING OF SCREEN DOORS.

The Caldwell Manufacturing Company, of Rochester, N. Y., have a low priced screen door check, of which a



THE CALDWELL SCREEN DOOR CHECK.

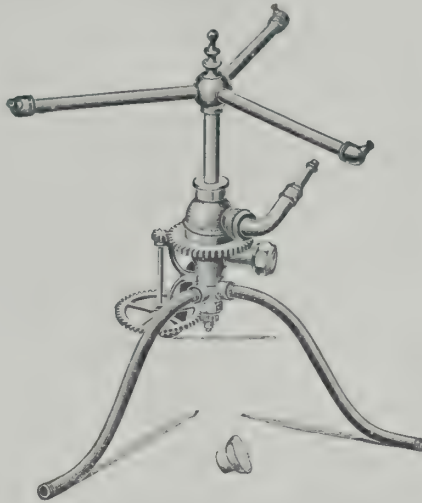
large number were put out last year, and proved very satisfactory. It is a simple and easily applied form of pneumatic check, adjustable to all sized doors, and is shown in the illustration applied to the casing between the doors. The check also works well on inside house or office doors, with the ordinary spring hinge or any door spring.

Quarrying by Means of Fire.

At Bangalore, in Southern India, the quarrying of granite slabs by means of wood fire has been brought to such perfection that an account of the method is given as follows in *Nature*: The rock forms solid masses, uninterrupted by cracks, for several hundreds of feet, and when quarried over an area is treated as follows: A narrow line of wood fire, perhaps seven feet long, is gradually elongated, and at the same time moved forward over the tolerably even surface of solid rock. The line of fire is produced by dry logs of light wood, which have been left burning in their position until strokes with a hammer indicate that the rock in front of the fire has become detached from the main mass underneath. The burning wood is then pushed forward a few inches, and left until the hammer again indicates that the slit has extended. Thus the fire is moved on, and at the same time the length of the line of fire is increased and made to be convex on the side of the fresh rock, the maximum length of the arc amounting to about 25 feet. It is only on this advancing line of fire that any heating takes place, the portion which has been traversed being left to itself. This latter portion is covered with the ashes left by the wood, and with thin splinters which have been burst off. These splinters are only of about $\frac{1}{8}$ inch thickness, and a few inches across. They are quite independent of the general splitting of the rock, which is all the time going on at a depth of about 5 inches from the surface. The burning lasts eight hours, and the line of fire advances at the average rate of nearly 6 feet an hour. The area actually passed over by the line of fire is 460 square feet, but as the crack extends about 3 feet on either side beyond the fire, the area of the entire slab which is set free measures about 740 square feet. All this is done with, may be, about 15 cwt. of wood. Taking the average thickness of the stone at 5 inches, and its specific gravity as 2.62, the result is 30 pounds of stone quarried with 1 pound of wood.

A NEW LAWN SPRINKLER.

The sprinkler shown in the illustration, with three swiftly revolving arms and a slowly revolving nozzle, is designed to sprinkle a much larger area than is possible with any other device of this nature, and is sold at a very moderate price. It is manufactured by the E. Stebbins

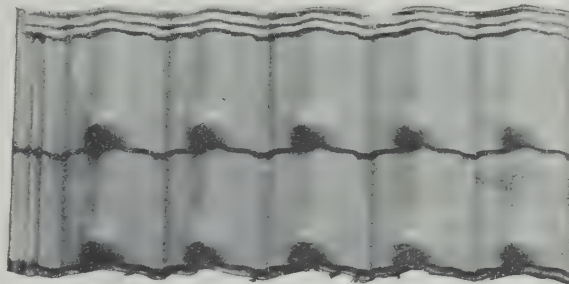


THE COMET LAWN SPRINKLER.

Mfg. Co., of Brightwood, Mass. With an ordinary force of water it will thoroughly sprinkle a space eighty feet in diameter. The hose, nozzle and tips on the ends of the arms are adjustable, so that it can be adapted to as small a space as desired.

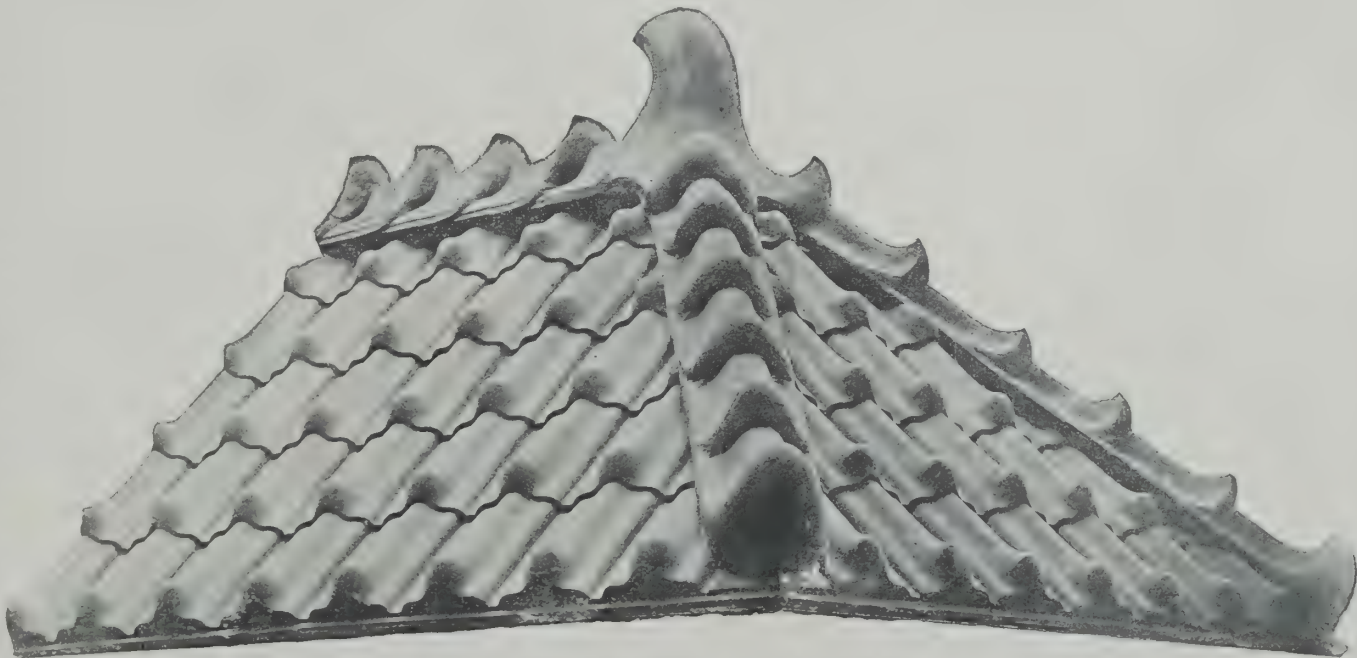
ART IN METAL TILE ROOFING.

The beautiful effects obtainable by the employment of tile roofing in all detached buildings having any pretensions to architectural merit are well understood by all builders of large experience, but the field for the development of this characteristic feature has been greatly enlarged by the introduction of the art metal tiling of W. H. Mullins, of Salem, O. This is a patent tiling, in which the beautiful curves and lines, the heights and valleys, and lights and shades of ancient roofing are maintained, although stamped in large sheets, containing from ten to eighteen embossed tile in each sheet. The



A TILE ROOFING PLATE.

number of joints and liability to leakage are thereby greatly reduced, and the roof can be put on very rapidly and cheaply. Copper is the preferred material, on



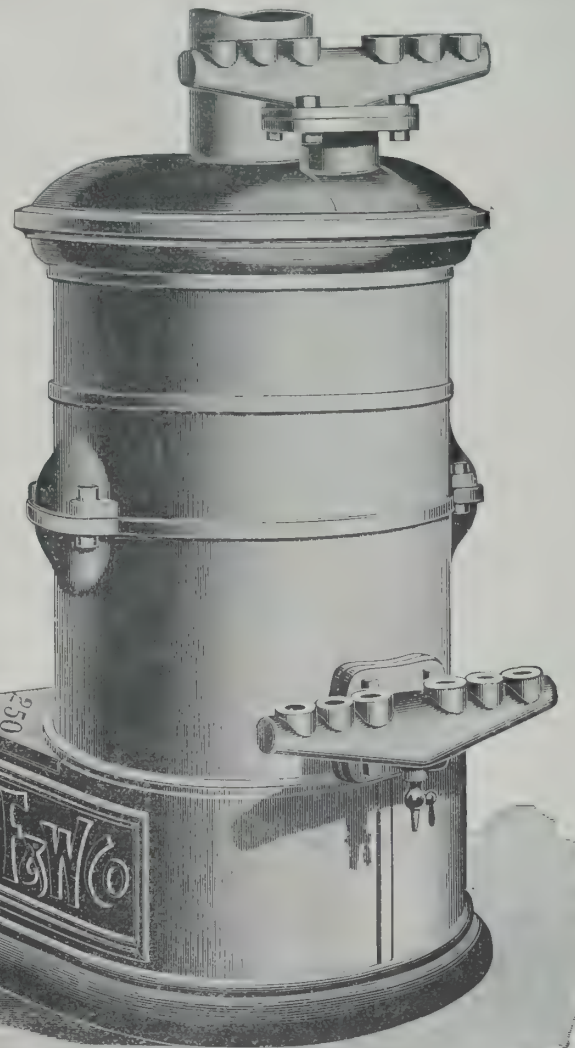
W. H. MULLINS' AMERICAN TILE ROOFING.

account of the fine dark bronze color it takes on exposure to the weather, but this tiling is also made in aluminum, zinc, tin, and black and galvanized steel.

MESSRS. A. NORTHROP & Co., of Pittsburg, Pa., manufacturers of paneled metal ceilings and stamped steel plates, report having greatly enlarged their plant by the introduction of considerable new machinery. They are getting out some new styles of embossed mouldings and panels.

AN IMPROVED HOT WATER HEATER.

For all kinds of house heating, the Fuller & Warren Co., of Troy, N. Y., manufacture heaters of superior excellence in many styles and sizes, so graded that they



THE FULLER & WARREN CO. HOT WATER HEATER.

can be used in buildings of almost any size, the smallest being rated to carry from 450 to 500 square feet of direct radiation, and the largest from 2,000 to 2,400. The accompanying illustration is a rear view of one of their heaters, with double water section, arranged with cast iron manifold for six flow and return. These heaters combine simplicity and strength, durability, economy, and powerful action, embracing in the construction of their grates, water sections and flue arrangements the latest ideas obtainable.

A Macadamized Road through Swampy Land.

A Telford road, recently built in Medford, Mass., by Street Commissioner John P. Prichard, was constructed through low, wet land, which had to be drained by a trench 4 feet deep, in which was a 6 inch pipe, with open joints. The trench was then filled with stone up to the subgrade of the avenue, which was well wet and rolled. On this was the Telford foundation, 9 inches deep at the centre, and gradually decreasing in thickness to 5 inches at the curb line. This foundation was wedged and knapped, and then covered with 4 inches of $2\frac{1}{2}$ inch stone, unrolled, which was covered in turn by 3 inches of 2 inch stone, spread with a shovel from a cart, wet and rolled. The surface was next filled with enough half inch stone to fill out all the inequalities, more sprinkling was done, and the surface again rolled to form a firm bed for a 2 inch course of 1 inch stone, well wet and rolled. This street, the *Engineering News* says, cost about \$3 a linear foot, including the expense of grading, trenching, pipe laying, catch basins, and other incidentals.

THE report of the German Railroad Union for the past year shows that the aggregate length of railroads in the union was 45,880 miles. There is a reported increase of 561 miles during the year. Of the entire mileage, 11,453 miles, or about 23 per cent., is double track roads.

POWER STATION, BROOKLYN CITY RAILROAD COMPANY.

The Eastern Power Station of the Brooklyn City Railroad Company, situated on the banks of the East River, in Brooklyn, N. Y., from the electrical and mechanical aspect is undoubtedly one of the most perfect steam and electric plants in existence. Throughout the entire structure every detail is applied to secure perfection of working and an accurate record of results. We show on page 80 the building proper, with its great chimney, designed to supply natural draught for the thirty-six Babcock & Wilcox tubular boilers eventually to be introduced. The chimney is of brick and rises to a height of 296 feet, and contains a circular shaft 17 feet in diameter. It is not only available for natural draught. Into its base a species of nozzle or intake is built, to which are connected two 12 foot Sturtevant blowers. When these are in operation, a torrent of air is injected in the base of the chimney, and acts injector-fashion to produce a draught. The advantages of this system are that it dispenses with the necessity for closed ash pans or boiler room.

Our view shows how remarkable a feature in the scenery this chimney is, and, although situated in the vicinity of the many-storied sugar refineries of the eastern district of Brooklyn, themselves remarkable for height, it dwarfs them all. The main building is of brick, which, with the chimney, forms a rare and interesting example of this class of masonry. Within the building of this station are large coal pockets, situated immediately under the roof, with a capacity for holding 6,000 tons, and near the base of the chimney is seen the coal-hoisting plant. Like other electric power and light stations in this vicinity, the general cycle of operation includes the receiving of coal into roof pockets, its delivery thence by gravity to the boilers, and the removal of ashes from the lower floor. The coal and ashes being weighed, and the water evaporated measured, and other accurate records of the process being kept, the entire operations of the station may be interpreted as an analysis on a gigantic scale for determining the efficiency of the processes and the quality of the fuel.

Tinners' Hardware and Roofers' Supplies.

Messrs. Berger Bros., of 231 Arch Street, Philadelphia, in their 1895 catalogue, present an attractive book of 125 pages which cannot fail to be of much interest to all plumbers, steam fitters and roofers, as well as architects who attend closely to the details of their specifications in the matter of plumbing and roofing. They send the book, free, on application to all interested in their lines. It is especially good in illustrations and descriptive matter touching gutters and gutter hangers, pipe, pipe hooks and fasteners, pressed steel bricks and rock-faced, and other steel siding, tin and steel roofing, galvanized and copper cornice work, malleable and gray iron castings, etc., and a full line of tinners' tools and roofers' adjuncts is also shown.

FINE SCREEN DOORS.

The illustration represents some new styles of screen doors, made by the A. J. Phillips Company, of Fenton, Mich., large manufacturers of this class of goods, which



STYLE "C."

STYLE "D."

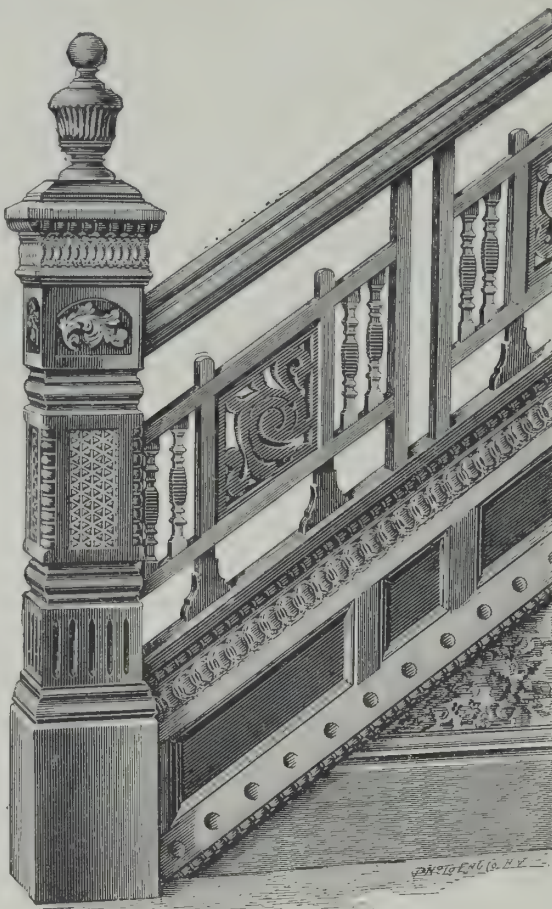
"SUBURBAN" PATTERN FINE SCREEN DOORS.

has been a specialty with them for several years. The doors are made from a number of kinds of woods and in a variety of finishes, from fine doors painted in several colors to rich red oak with a highly polished finish. The company also make window screens for half window sizes, sliding and removable, to be used either at the top or bottom of a window, and full size screens, to be used with hinges, spring bolts, hooks, or otherwise. They have just issued a finely illustrated catalogue which they would like to send to all intending purchasers of screens.

PLATINUM has been drawn into smooth wire so fine that it could not be distinguished by the naked eye, even when stretched across a piece of white cardboard.

STAIR FINISHING.

The accompanying beautiful design of stair finishing, just copyrighted by Messrs. S. E. Smith & Bro., of St. Paul, Minn., is well adapted to meet the wants of those who are looking for something different from the old styles, and which is also elegant and effective, without being very expensive. The firm bringing it out have

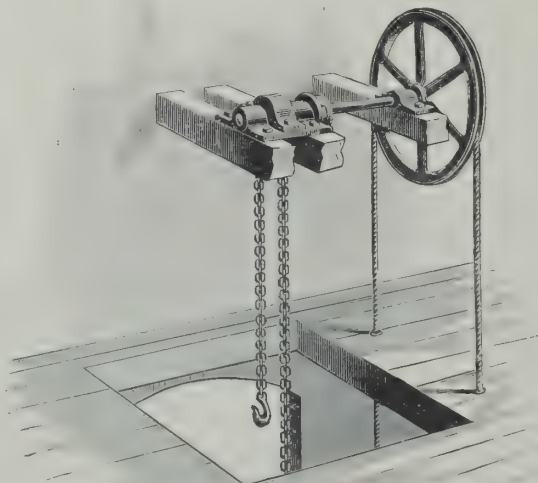
**A NEW DESIGN FOR STAIR FINISH.**

had twenty-four years' practical experience as stair builders, and have one of the finest stair building factories in the Northwest, in the neighborhood of the great hardwood forests of Minnesota and Western Wisconsin. They are constantly producing new and original styles of work, and their factory is fitted up with the most improved machines and tools for stair building.

THE Ninth Annual catalogue of the Pullman Sash Balance Co., Rochester, N. Y., just issued, gives a full description, in well printed text and illustration, of their line of steel frame sash balances, spring hinges, thermometers, etc. Their balances are easily applied and run noiselessly.

A HOIST FOR USE OVER HATCHWAYS.

The hoist shown in the accompanying illustration is designed to render accidents impossible. It is manufactured by John Gleason's Sons, corner Second and Diamond streets, Philadelphia, and has an automatic safety mechanism to prevent the running down of the

**GLEASON'S DOUBLE LIFT SAFETY HOIST.**

rope when one lets go of the rope, and raising or lowering of the load taking place only as fast and as long as the rope is pulled. It is a cheap, safe, and simple machine, especially recommended for mills, railroads, factories, stores, freight houses, etc.

Ventilating the Schoolroom.

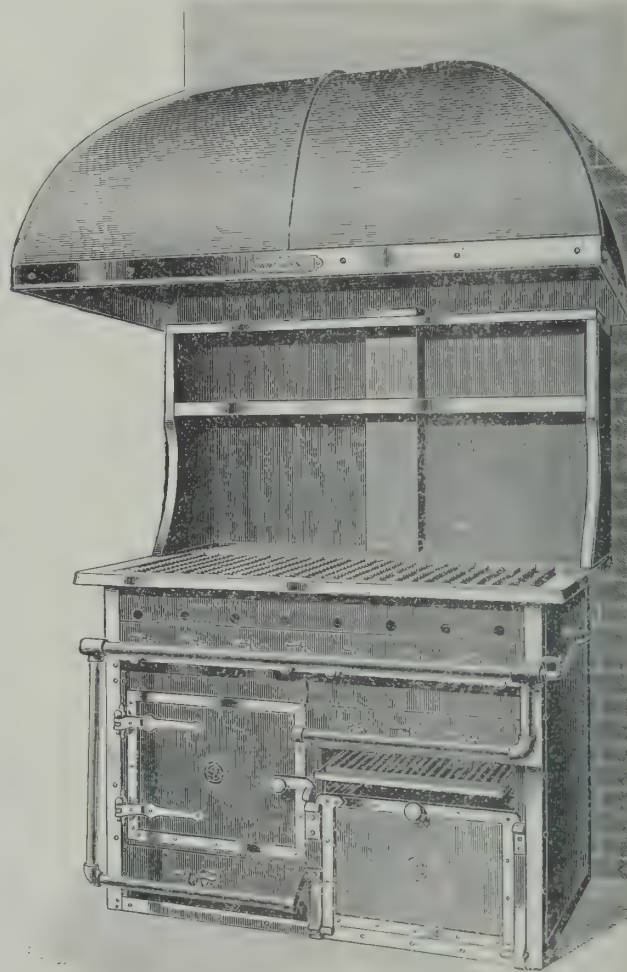
Dr. Shaw, a prominent pedagogist, in an address delivered recently before the Association for Improving Public Schools, has made some very interesting suggestions concerning the proper arrangement and equipment

of schoolrooms. In the matter of ventilating and lighting, Dr. Shaw believes that an ideal schoolroom should provide fifteen square feet of floor space for each pupil, and a supply of 200 cubic feet per minute for every person in the room. A supply of less than twenty cubic feet he considers very bad ventilation. Such provisions would insure the free movement of every child and a wholesome amount of air. As to the question of the light supply, Dr. Shaw suggests the use of the French system.

In France the perfect schoolroom, it is thought, should have a glass surface equal to one-fourth the floor space. It is also thought best to have individual seats and desks for the pupils. The following very significant figures concerning the conditions of our public schools were brought together some few years ago, and the same condition, it is said, exists at the present day. The floor space per pupil in the schools of Boston average 15 square feet, in Chicago 14 square feet, in Washington from 10 to 15 square feet, and in New York from 5 to 9 square feet. In the matter of ventilation the average in the Boston schools was found to be about 185 cubic feet, in Chicago 225 cubic feet, in Washington from 115 to 250 cubic feet, and in New York from 70 to 100 cubic feet. The average schoolroom, especially of New York, it would seem, is insufficiently ventilated and very much overcrowded. There is, besides, very often a lack of a wholesome quantity of sunlight and an inadequate supply of desks. The fault is a very serious one. It is to be hoped that some trustworthy scientific standards relating to these matters may be adopted and rigidly enforced.

A GAS BURNING RANGE.

The illustration represents an improved range in which gas is burned, of a size suitable for use in hotels and large families. Unlike ranges in which coal is burned, every inch of the top is a continuous hotbed and a cooking surface. The group of the burners is an important feature, all being self lighting by means of pilot lights. The ovens have a capacity to receive the largest joints of beef. No gas enters the ovens, which are heated by burners beneath. The ovens are lined with mineral wool, and the heat passes around them through hot air chambers to the flue. These ranges are made of any desired size, and with a variety of trimmings and attachments, by Messrs. Wm. M. Crane & Co., 838 Broadway,

**THE VULCAN STEEL RANGE.**

New York, who also manufacture a complete line of gas appliances. The extent to which gas is now being employed for all kinds of cooking and heating purposes, and the very short time it has taken for its use to become so considerable, make it a matter of considerable importance for builders of apartment houses, flats, and dwellings generally to give the subject a discriminating investigation before planting in new structures the old time kitchen ranges and heating appliances.

THE WHEELING CORRUGATING Co., of Wheeling, West Va., are large manufacturers of artistic steel ceilings, in beautiful raised designs which give especially fine effects. The company also manufacture tin and terne plates, tin and steel roofings, sidings, conductor pipes, eaves troughs, etc.

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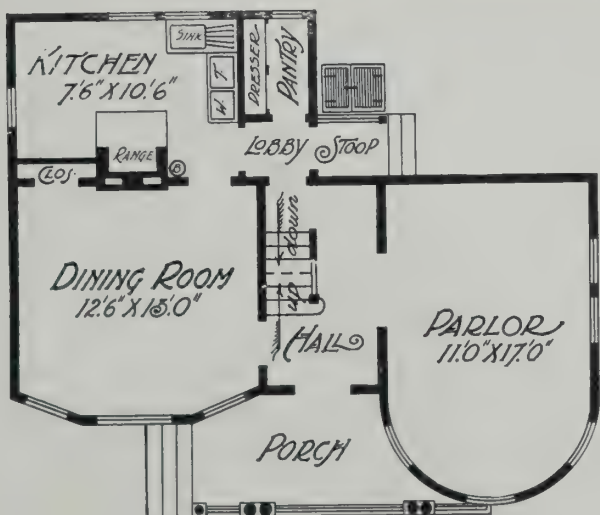
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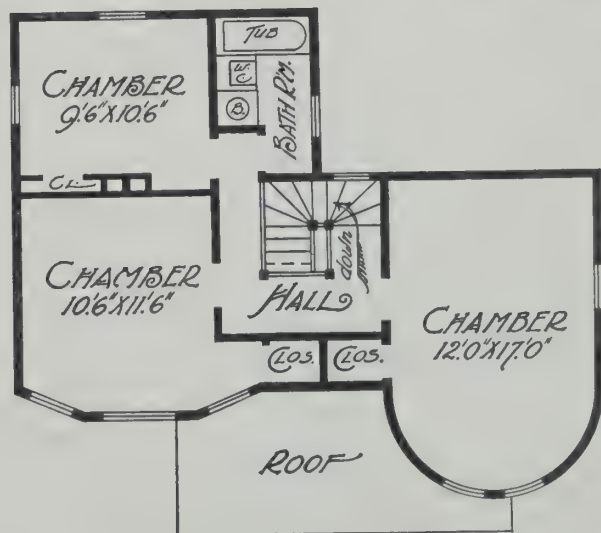
EDITION.

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No. 6.



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

A COTTAGE AT BRONXWOOD PARK, N. Y.—See page 86.



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A. E. BEACH.

NEW YORK, JUNE, 1895.

THE

Scientific American,

BUILDING EDITION.

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This is a special Edition of THE SCIENTIFIC AMERICAN, issued monthly. Each number contains about 32 large quarto pages, forming, practically, a large and splendid Magazine of Architecture, richly adorned with elegant plates and fine engravings; illustrating the most interesting examples of modern Architectural Construction and allied subjects.

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SCIENTIFIC AMERICAN, BUILDING EDITION.

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A COTTAGE AT BRONXWOOD PARK, N. Y.

We illustrate on page 85 a cottage at Bronxwood Park, Williamsbridge, N. Y., erected for Dr. Geo. P. Shirmer. The view shows a pleasing design for a cottage of low cost, underpinning being of local stone, structure above sheathed, papered, and shingled with circular and octagonal butt shingles. Clapboards have been used for portions of first story. The general color effect is brown. There is an entrance porch, which is covered by main roof. Circular and angular bay are gable-roofed. Dimensions: Front, 32 ft.; side, 27 ft. 6 in. over all. Heights: Cellar, 6 ft. 6 in.; first story, 8 ft. 6 in.; second, 8 ft.; attic, 7 ft. 6 in. The plan shows a convenient arrangement for a small house: parlor and dining-room, having bays; pantry, with dresser, and kitchen, with usual fixtures; three chambers and bathroom on second floor; attic unfinished. Cellar contains hot air heater, fuel storage, etc. Cost about \$2,500. Finish white pine. A. F. Leicht, Esq., architect, 62 Liberty Street, New York City.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT WILLIAMSBRIDGE, N. Y.

On page 87 we give the plans of a cottage erected for Mrs. M. A. Shirmer, at Bronxwood Park, Williamsbridge, N. Y. The perspective of the building is shown in colors on our cover page. The view shows a cottage of neat design and low cost, having a veranda with columns supporting main and separate roof above. Corner tower, open above, overhanging gables and dormers relieve the great expanse of roof. Underpinning of brick; framework above, sheathed, papered, clapboarded, and painted light green. All shingles are of tin, being painted gray at porch. Tower roof, light green sides, burnt sienna; main roof brown. Trimming color, dark green; stained glass in front door, and small leaded window at side. Dimensions: Front, 24 ft.; side, 37 ft., including veranda projection. Heights: Cellar, 6 ft. 9 in.; first story, 9 ft.; second, 8 ft. 6 in.; attic, 8 ft. (unfinished). The plans show an entrance hall, with staircase at right; parlor, with bay its full dimension, and sliding doors to dining-room, the width of building; this room is well lighted and has mantel. Butler's pantry, with dresser and shelves, connects with kitchen, with usual fixtures, including two washtrays. Second floor is divided into three chambers, principal one having dressing room and a bathroom, provided with fixtures of good make. Cellar, cemented, contains hot air heater, room suitable for laundry and fuel storage. Cost \$2,200. A. F. Leicht, Esq., architect, 62 Liberty Street, New York City.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT FLATBUSH, L. I.

We publish on page 88 a cottage erected for W. K. Clarkson, Esq., on Caton Avenue, Flatbush, L. I. The design is rather picturesquely treated, having a well shaded front piazza, with balcony above, octagonal bay for corner feature, with roof joining the main gable, and square bay at side, with shingled goosenecked rail for balcony above. Dimensions: Front, 30 ft. 2 in.; side, 35 ft. 5 in., including bay, but not porch. Projections: Heights: Cellar, 7 ft.; first story, 10 ft. 2 in.; second, 9 ft. 2 in.; attic, 8 ft. Underpinning of brick. First story sheathed, papered, clapboarded, and painted light brown. All above, shingled, and left to weather (slip and round butt shingles used in gables). Trimming color, light yellow. The first floor plan shows vestibule, with sash door opening on reception hall, with tiled fireplace and mantel, open staircase, with 6 x 6 in. ornamental newel, and turned balusters, all in ash. Nook has seat, with lid. Plaster tinted terra cotta. Parlor and dining room both connect by five-panel sliding doors. The former room has walls tinted light terra cotta, the latter light buff; also, fireplace. All these rooms finished in Western whitewood, and panel backs for windows. Butler's pantry is means of passage to kitchen, provided with usual fixtures, and trimmed the same as all remaining rooms, white pine. Second floor plan shows four chambers, all with ample closet room, and the bath, with fixtures complete. Attic has one bedroom finished off, and two storerooms. Cost \$5,000. Christofer Myers, Esq., architect, 361 Broadway, New York City.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT BEDFORD PARK, NEW YORK CITY.

We present on page 89 a modern cottage of moderate cost, suitable for a 25 ft. city lot, recently erected on Briggs Avenue, Bedford Park, New York City, for Mrs. Lisette Wallace. The exterior, though not distinctive in style, is quite effective, having an entrance porch, with columns on shingled bases, supporting roof above; gable feature, as well as window behind, is decorated with composition rococo ornament; bay projects to line of gable, which is relieved by ombra; a similar bay, with gable above, is seen at side, supported by brackets. Dimensions: Front, 18 ft. (including bays, 20 ft. 6 in.); side, 44 ft., exclusive of rear porch. Heights: Cellar, 7 ft.; first story, 10 ft.; second, 8 ft. 8 in.; attic, 8 ft. Underpinning of local stone, front being of field stone, laid with sunken joints;

framework above, covered with sheathing, paper and clapboards, painted light green. Slip and octagonal butt shingles are used for band, gables, etc., and are stained a deeper tint of same color. Trimming color, as well as stucco work, light yellow; blinds, olive green. Roof, gray slate. The plans show an entrance porch; tiled vestibule, with sash door to hall; parlor, having bay full width, tiled fireplace, and sliding doors to dining-room, also, with bay full width, and similar fireplace at angle; pantry, with ample shelving, is means of passage to kitchen, with usual fixtures, including two washtrays. Second floor is divided into three rooms, with ample closet accommodation, and bathroom, with fixtures complete. Attic has three rooms finished off. Cellar, cemented, contains hot air heater, fuel storage, etc. Chimney of brick, corbeled at top, and capped with stone. Cost \$3,000. Edgar K. Bourne, Esq., architect, 18 Broadway, New York City.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

BEDFORD PARK CONGREGATIONAL CHURCH, NEW YORK CITY.

We illustrate on pages 90, 91, the Bedford Park Congregational Church, corner Suburban Street and Bainbridge Avenue, New York City. The exterior is successfully treated, the severe roof lines being relieved by square tower, and the two dormers giving opportunity for high windows. The design, although suggestively Gothic in constructive work, shows round arches having been used instead of pointed. There is an entrance porch with high gabled roof, wide entrance doors leading to vestibule, 9 feet square, which forms tower above. Five foot openings at each side to auditorium, roof of which is supported by open hammer beam trusses of yellow pine, all edges chamfered. Ceiling and wainscot (4 ft. high) of same wood. Walls plastered, sand float finish. Seating capacity, 290. The basement plan shows a good sized Sunday school room, which is also used for meetings, sociables, etc. Kitchen with gas stove, sink and closet. The building is heated by combination steam and hot air furnace. Dimensions: Front, 54 ft.; side, 40 ft. over all. Underpinning and structure above of local rock-faced stone, laid with joints well broken. Gables, etc., shingled and stained brown. Trimming color, deep terra cotta. Roof covered with gray slate. Cost complete \$7,000. Edgar K. Bourne, Esq., architect, 18 Broadway, New York City.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A HOUSE AT NEW DORP, STATEN ISLAND.

We show on page 95 a tasteful little Colonial cottage, recently erected at New Dorp, Staten Island, N. Y. It contains a hall, parlor, dining room, butler's pantry, and five bedrooms and a bathroom on the second floor. These rooms all have straight sides, and ample closets under the gambrel eaves. This house was built complete, heated with hot air, and good plumbing, for \$3,675, from the plans and under the supervision of Child & De Goll, architects, 62 New Street, New York City.

A RESIDENCE AT GERMANTOWN, PA.

We show on page 96 an illustration of a cream brick city residence, with white trimmings, built for Dr. George H. Clarke, on West Walnut Lane, Germantown, Philadelphia, Pa. This house was built of a light brick, with a light green slate roof, and a cream white finish; is arranged with a side entrance from a porte-cochère, and also with a front entrance into a reception hall, with large open fireplace. The kitchen, butler's pantry and dining-room are all well planned, well lighted rooms, and there are four good rooms on the second floor. This house was built from the plans and under the supervision of Child & De Goll, architects, 62 New Street, New York. and was finished complete with hot water heating, electric lighting and fine plumbing for about \$10,500.

PRESIDENT LOW, of Columbia University, New York City, has lately bestowed upon that institution the noble benefaction of one million dollars, for the erection of a magnificent library in memory of his venerated father.

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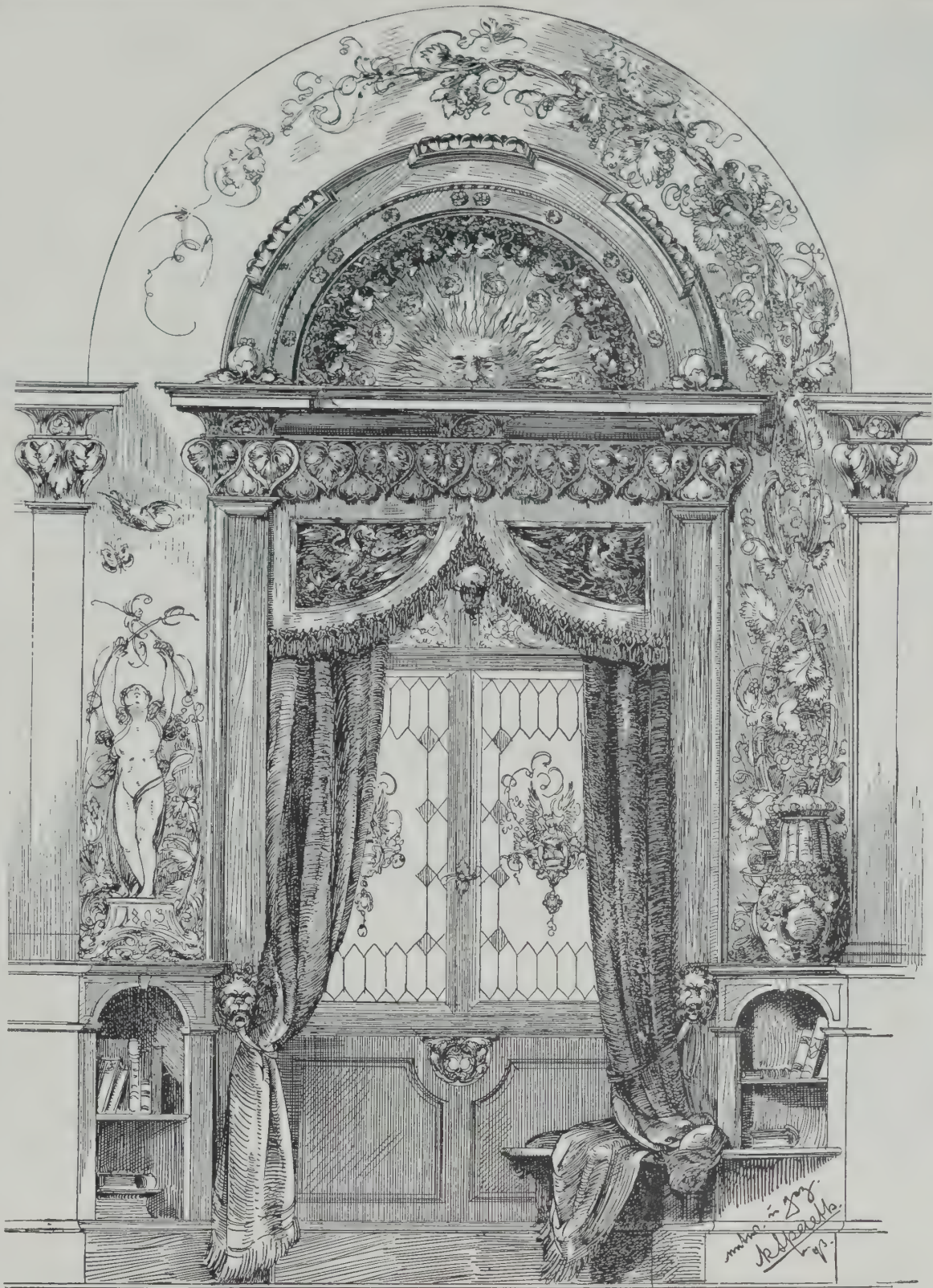
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THE NEW THEATRE, SAN
LUIS DE POTOSI,
MEXICO.

On the 16th of September, 1889, the first stone of the beautiful edifice which we show on page 97 was laid by Governor Gutierrez. It occupies the ground formerly covered by the convent of Carmen, and afterward by the penitentiary. There has been expended in this new work some \$400,000, a large sum for such a city; but it may be said that Potosi now has the honor of possessing the best theatre in Mexico, if not in Spanish America.

It is situated in the centre of the city, on the east side of the Plaza of Hidalgo, and occupies a space of 4,500 square meters. The portico presents four columns of the Corinthian order, with capitals sculptured by workmen of the city, of very beautiful execution. Not less handsome is the atrium which these columns sustain. The vestibule, entered by five doors, is surmounted by a beautiful dome, which rests upon sixteen columns. At the right and left of the vestibule two beautiful stairways arise, which lead up to spacious and elegant corridors, and from these the first series of boxes are entered. The decorations of the theatre are most beautiful. There are a dozen paintings, allegorical, which represent music, painting, comedy, science, poetry, history, tragedy, architecture, etc. These were executed by Señor Sanchez. The general ornamentation is rich in details, luxurious and elegant. The edifice is lighted inside and outside with electric lights.

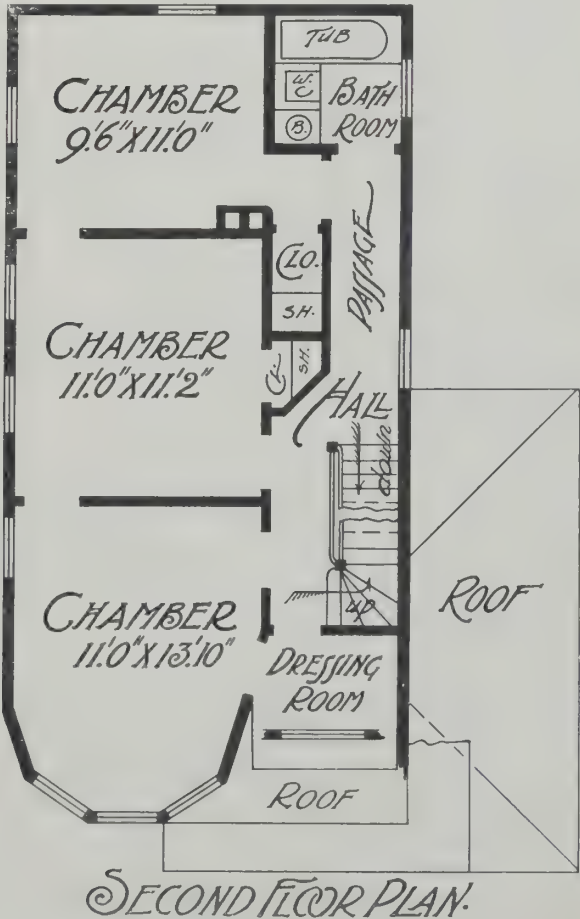
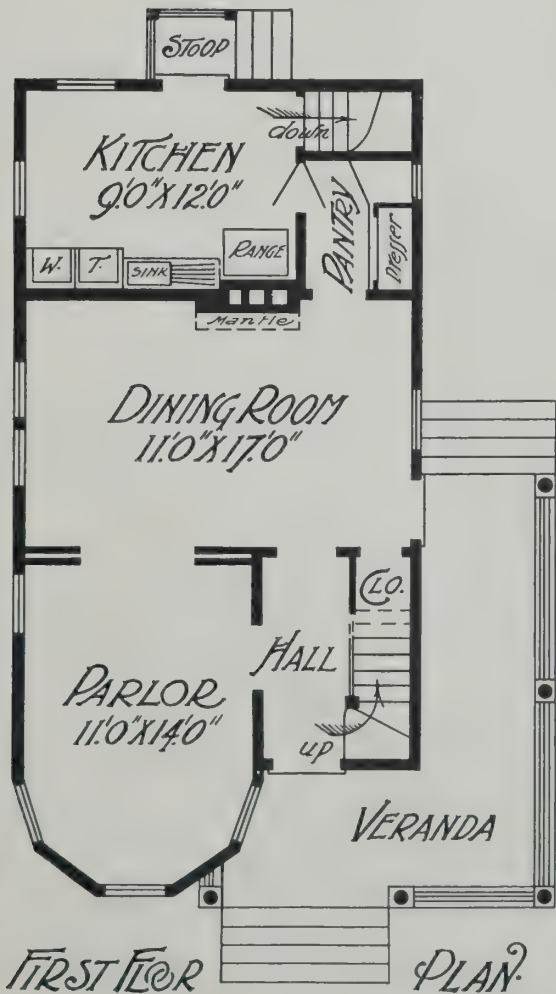
The architect was Don José Noriega, a distinguished Mexican architect.



DESIGN FOR A WINDOW DECORATION.—From *Moderne Innen-Decoration*.

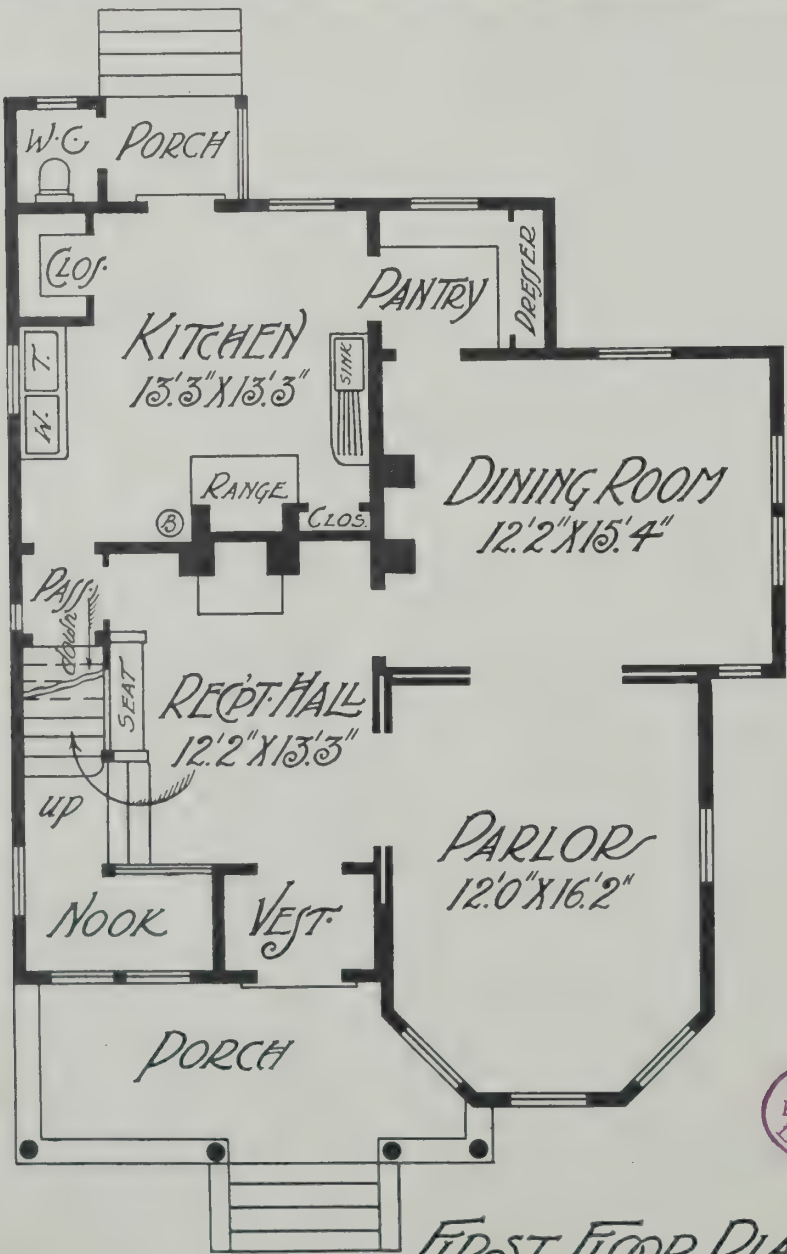
The Hanging Gardens of
Babylon.

The most magnificent landscape gardening of ancient times was the hanging gardens of Babylon. Nebuchadnezzar constructed this marvelous creation, one of the wonders of the ancient world, to gratify a whim of his queen, Amyntis, a Median princess, reared in a country of hills and valleys and cascades. Transported to the flatness of the Babylonian plain, she sighed for her native mountains. If we are to believe it, says a writer in the *Churchman*, the pensile paradise rose in answer to her sighs. This great work was an elevated rather than a "hanging paradise." In fact, it was an artificial mountain, covered with trees and plants, and gay with the singing of birds and the splashing of fountains. The base of this aerial paradise was four hundred feet square. From this foundation rose terrace above terrace, to the number of twenty, resting on arches, and rising to a height which overtopped the walls of the city. The terraces themselves were formed of a succession of piers, the tops of which were covered by flat stones, 16 feet long and 4 feet wide. Upon these were spread beds of matting, then a thick layer of bitumen covered with sheets of lead. This solid pavement was overlaid with earth to a depth sufficient to afford nourishment to the roots of the largest trees. Every plant and shrub that could be culled from the regions under Nebuchadnezzar's sway was transplanted to these terraces, and all were kept in a flourishing condition by water raised from the Euphrates, through the aid of hydraulic engines that were concealed in the galleries.

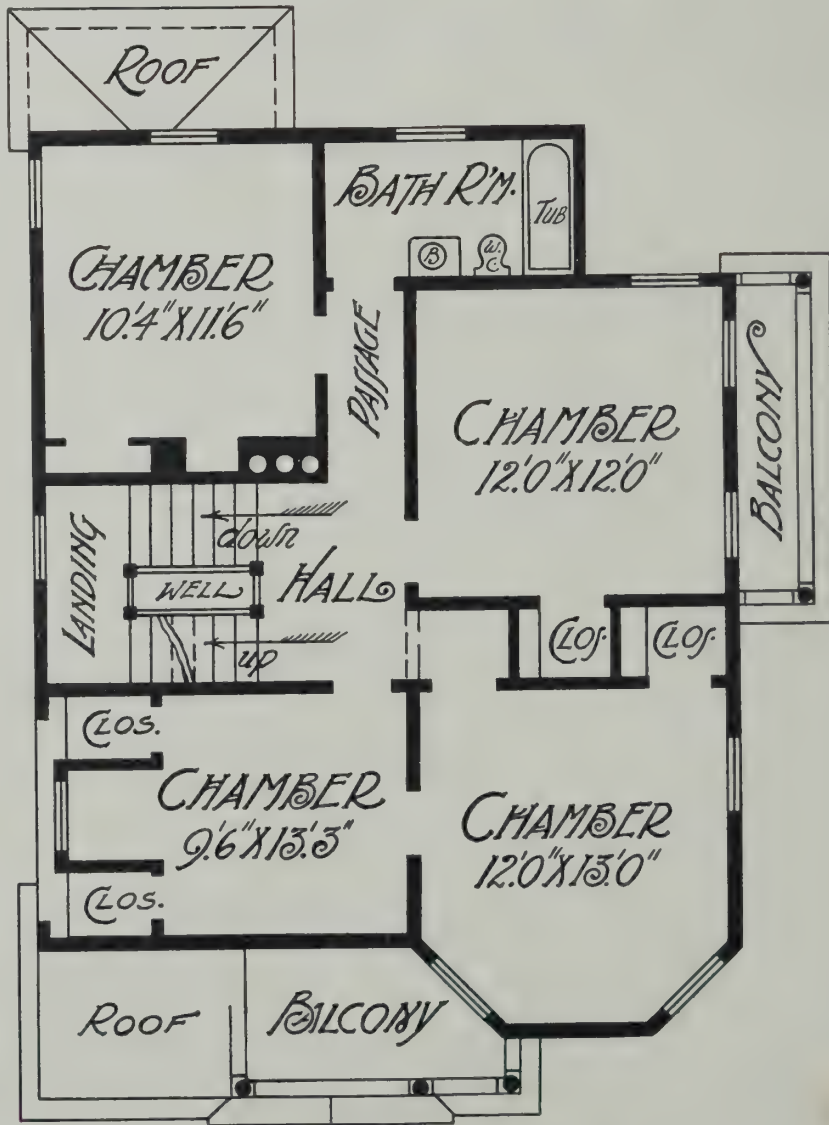


A COTTAGE AT WILLIAMSBRIDGE, N. Y.—See page 86.

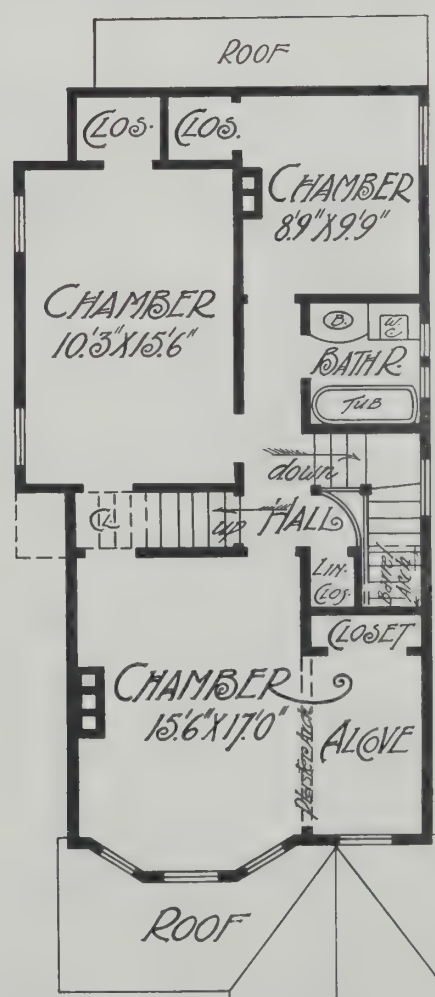
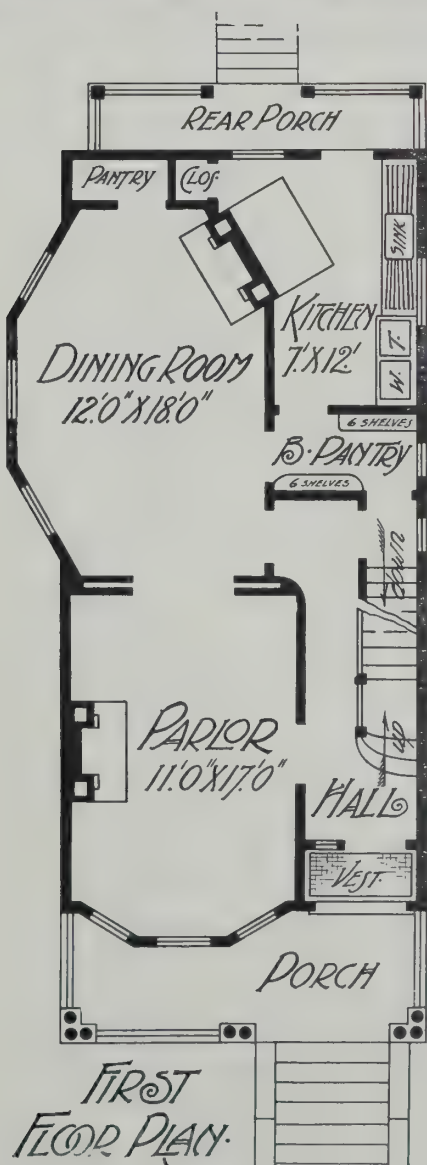




FIRST FLOOR PLAN.



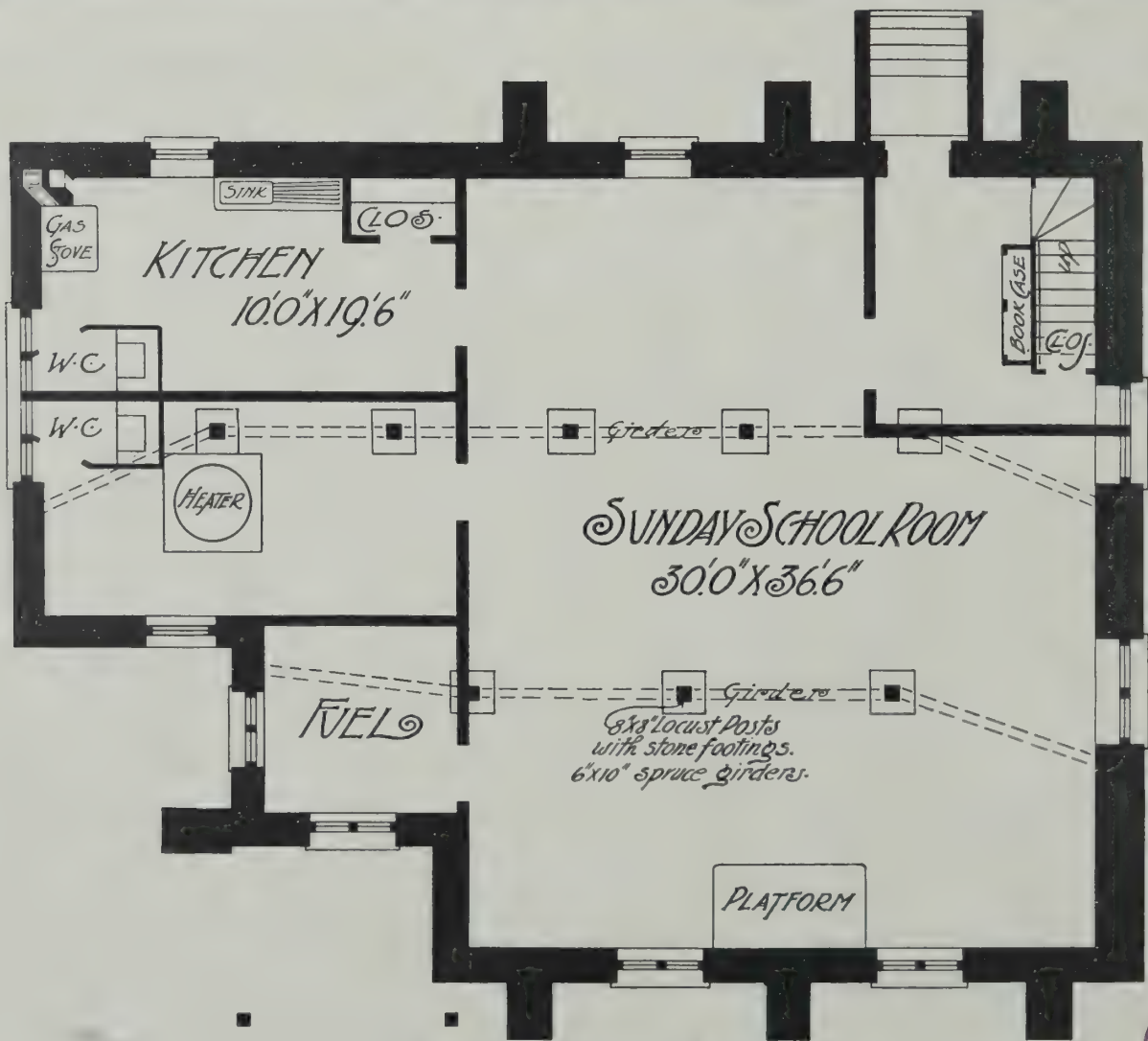
SECOND FLOOR PLAN.



SECOND FLOOR PLAN.



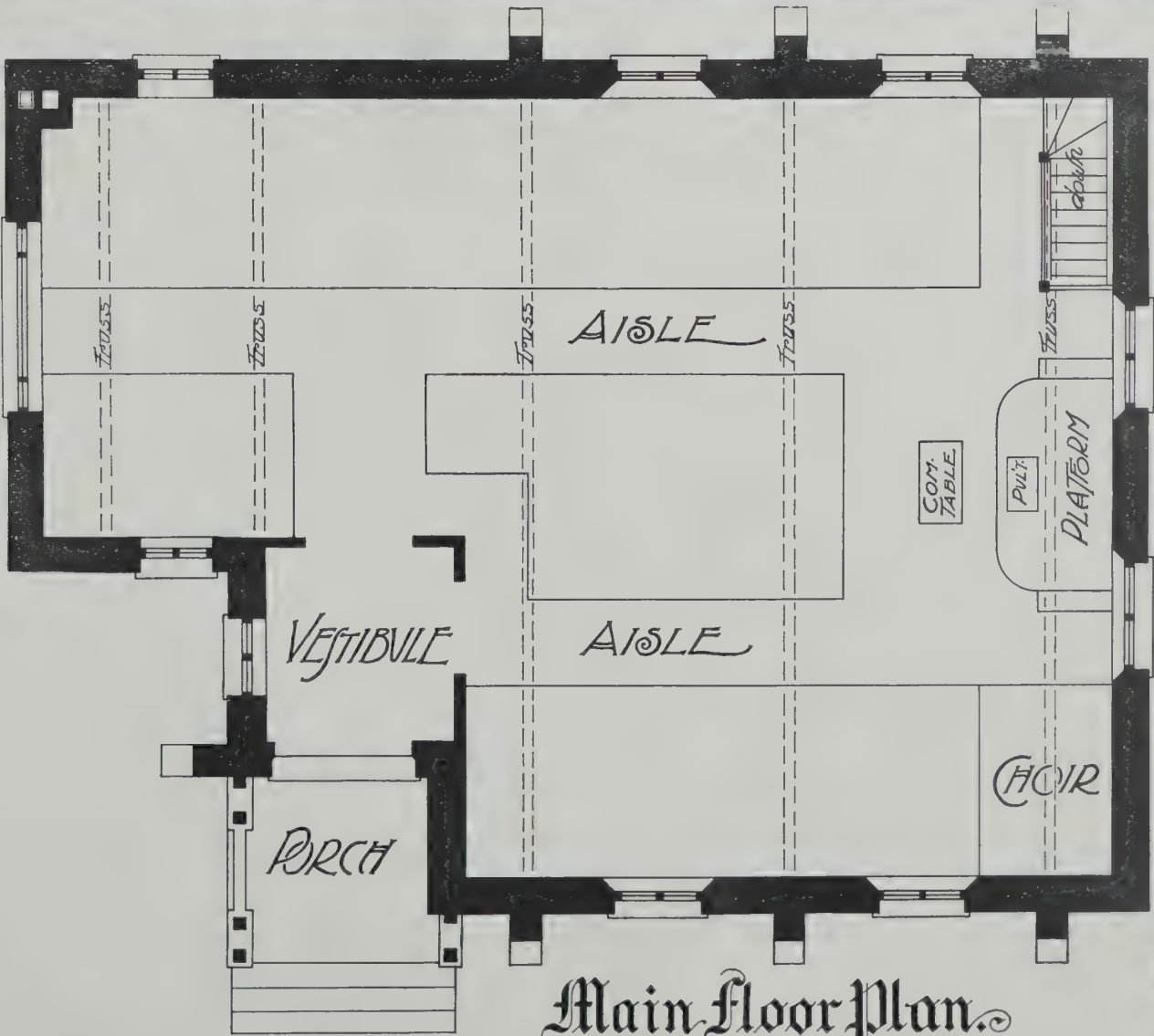
A COTTAGE AT BEDFORD PARK, NEW YORK CITY.—See page 86.



Basement Plan.

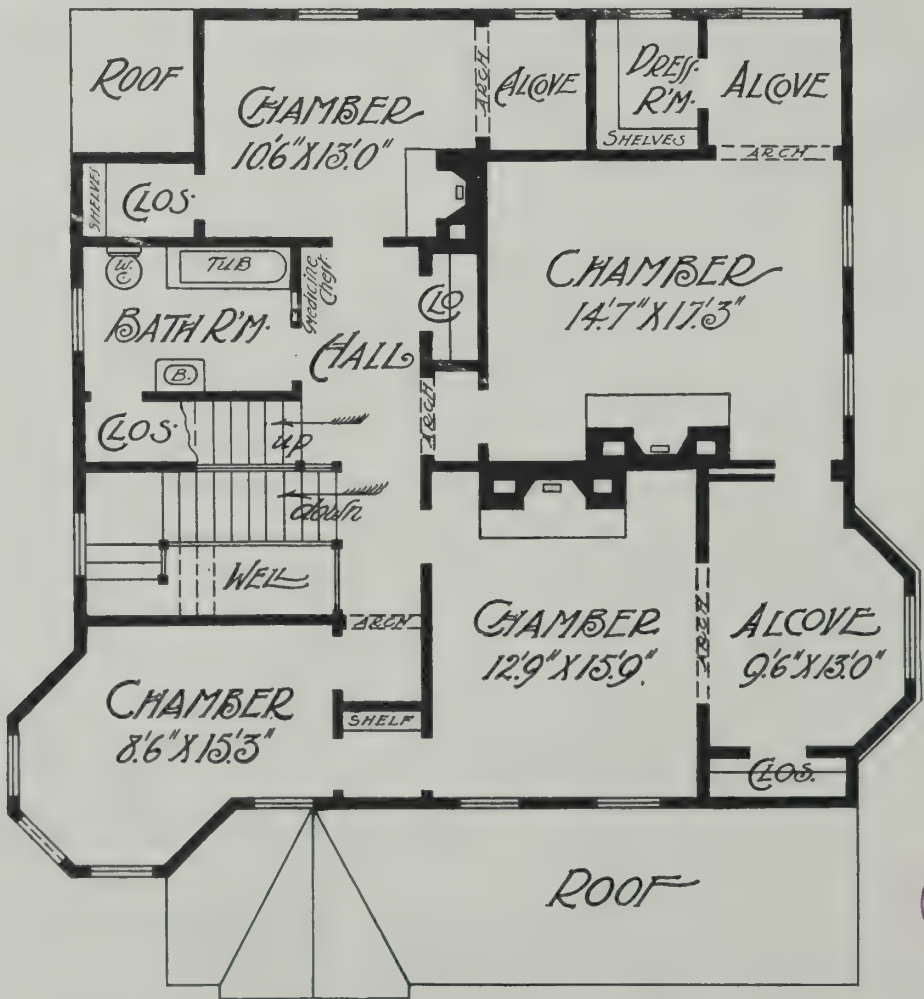
BEDFORD PARK CONGREGATIONAL CHURCH, NEW YORK CITY.—See page 86.





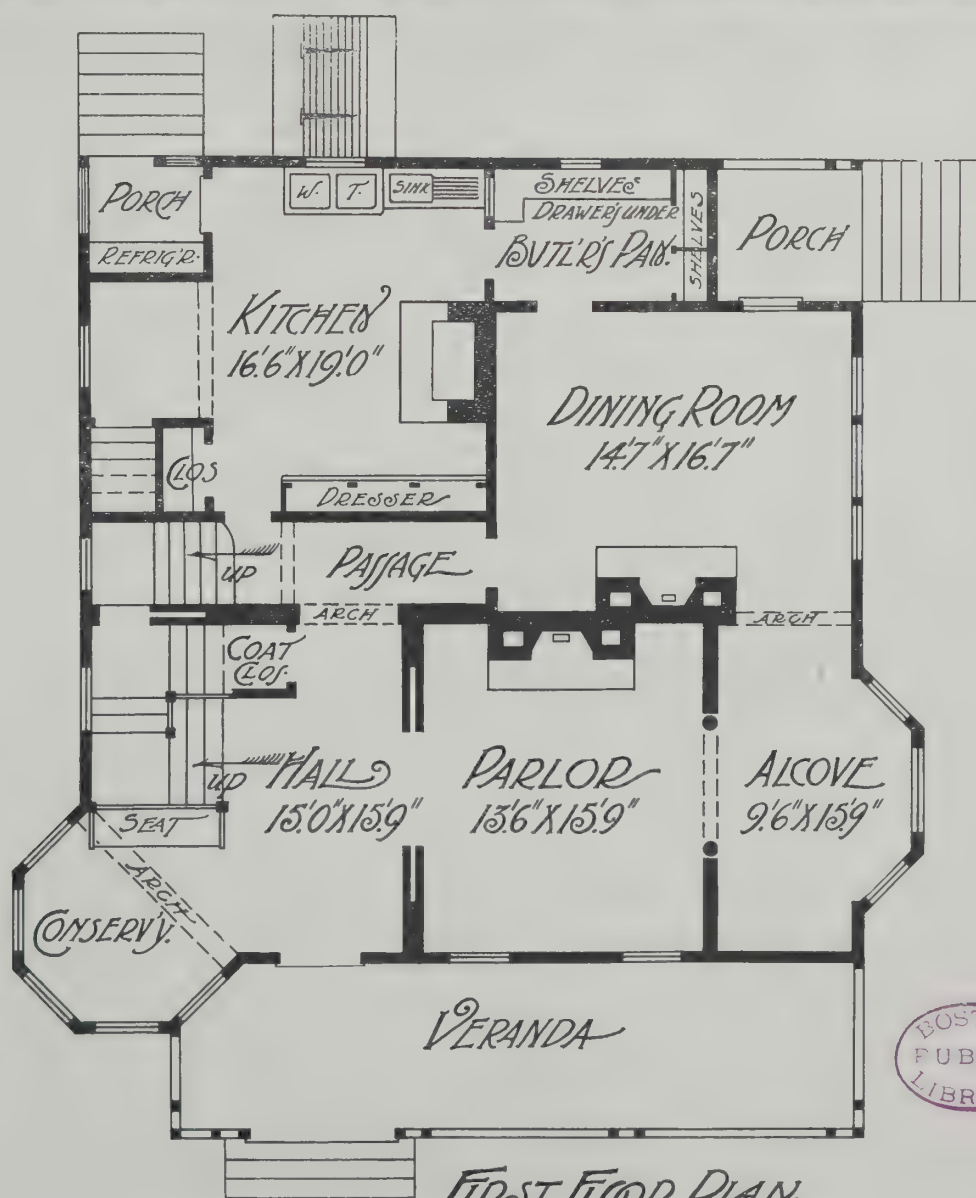
BEDFORD PARK CONGREGATIONAL CHURCH, NEW YORK CITY.—See page 86.





SECOND FLOOR PLAN.

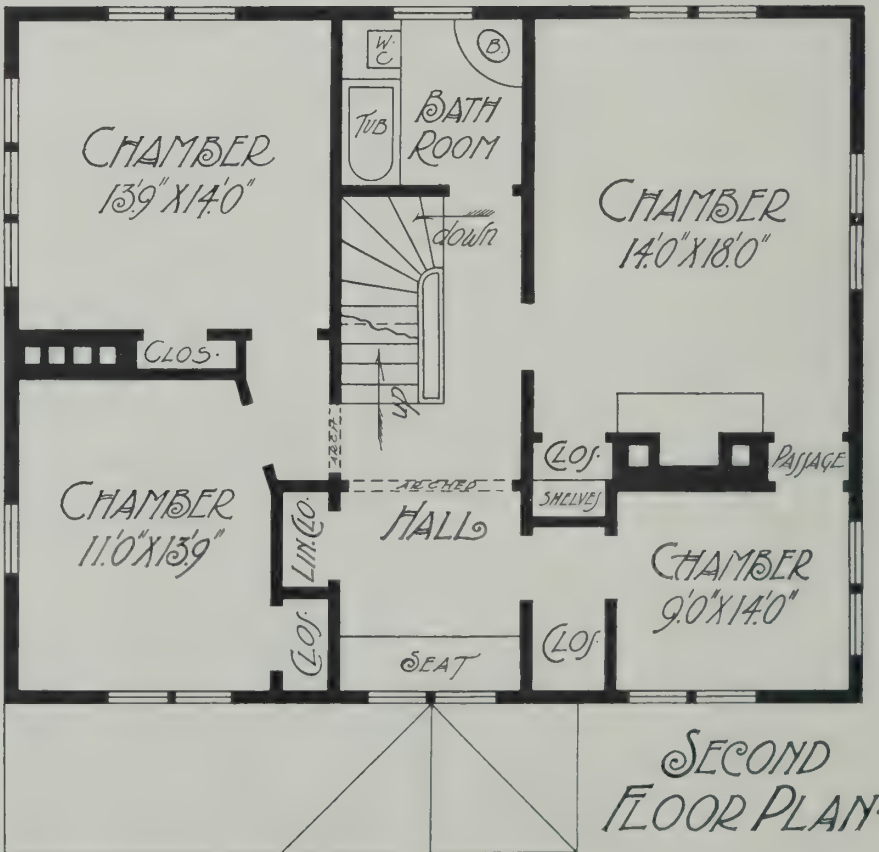
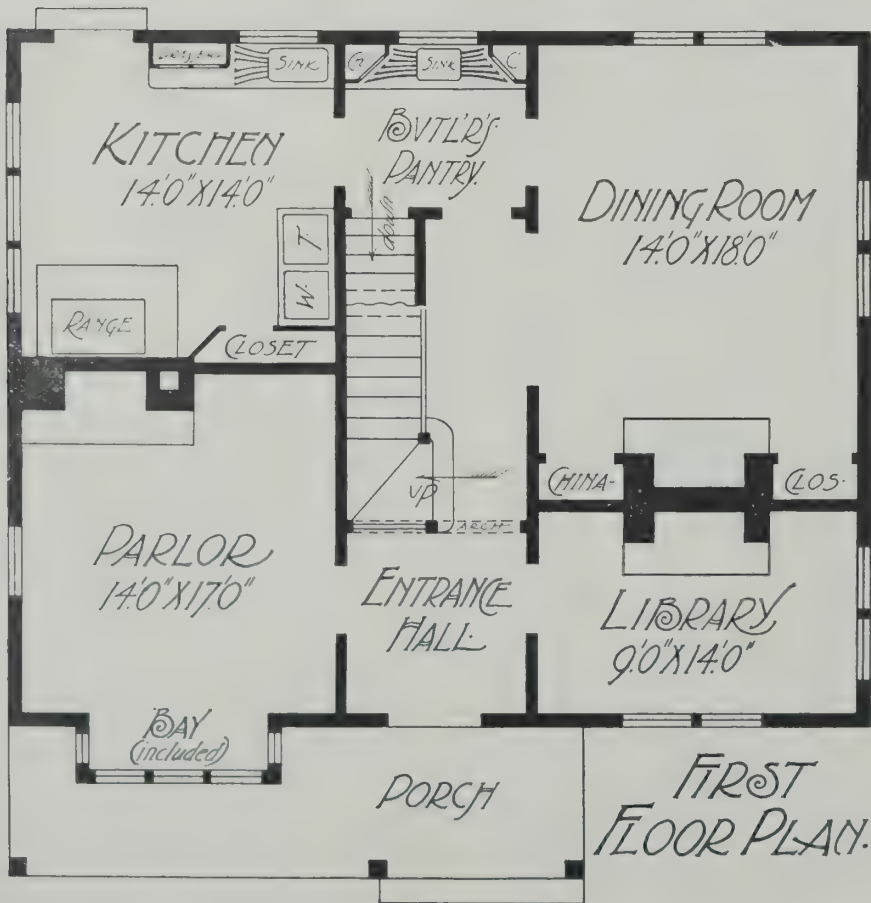
A RESIDENCE AT MONTCLAIR, N. J.—See page 97.



FIRST FLOOR PLAN.

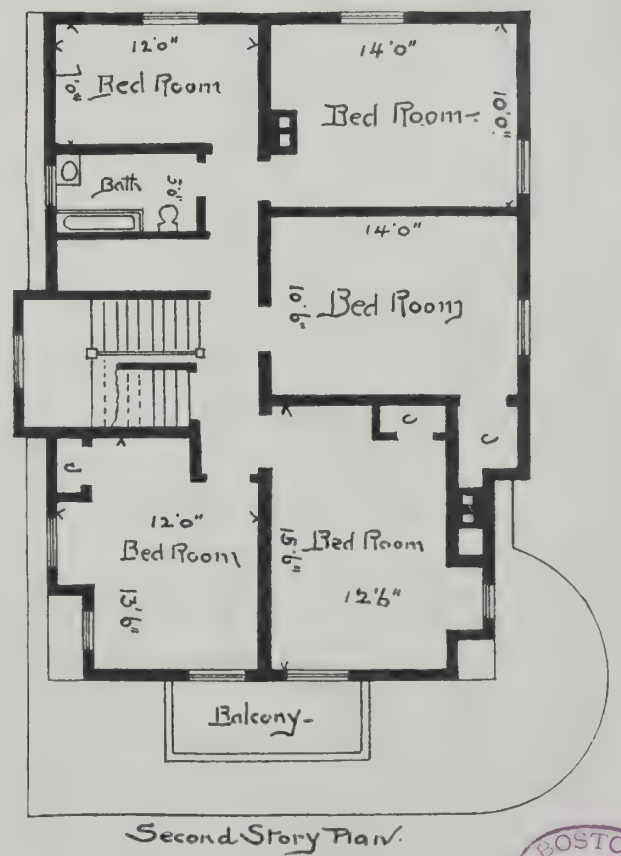
A RESIDENCE AT MONTCLAIR, N. J.—See page 97.



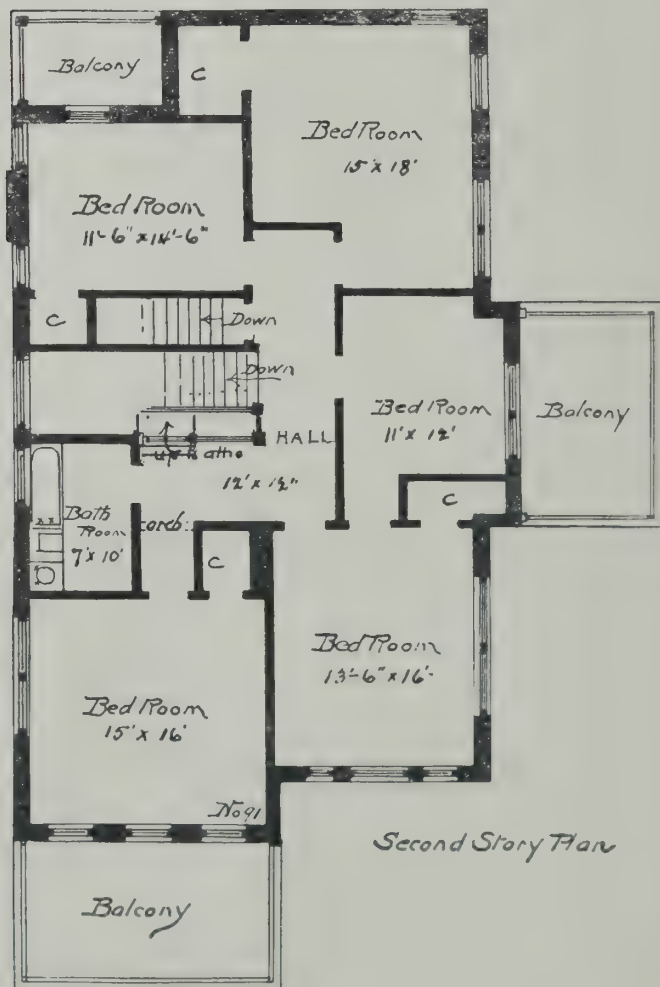


A COTTAGE AT GLEN RIDGE, N. J.—See page 97.





A HOUSE AT NEW DORP, STATEN ISLAND.—See page 86.



A RESIDENCE AT GERMANTOWN, PA.—See page 86.

A RESIDENCE AT MONTCLAIR, N. J.

Our views and floor plans on pages 92 and 93 illustrate the residence of E. P. Sanford, Esq., on Plymouth, near Clinton Avenues, Montclair, N. J. The design shows a well shaded veranda, with square chamfered columns, supporting shingled roof above and gabled effect at entrance; corner octagonal tower and dormer windows relieve the lines of the gabled roof which projects to line of bay on principal side. Chimneys of brick, capped with stone. Dimensions: Front, 37 ft. 10 in.; side, 38 ft. 9 in., exclusive of all projections. Height: Cellar, 7 ft.; first story, 10 ft.; second, 9 ft. 6 in.; attic, 8 ft. Underpinning of local stone of pleasing color, red mortar joint. Structure above, sheathed, papered, shingled and stained snuff-brown; roof shingled and left to weather. Trimming as well as blinds painted dark green. First floor plan shows a large reception hall, with arch to conservatory in tower; wide staircase, of easy rise, having ornamental newel and spindle balusters running to ceiling, all in light quartered oak; leaded glass windows on platform; sliding doors to parlor, with wide fireplace, tiled in light blue; wide arch to alcove, or library, with bay; finish cherry. Dining-room, also having fireplace and wide mullioned window, connects with kitchen, containing dressers, wash trays and the usual

small squares, glazed. Dimensions: Front, 38 ft.; side, 30 ft. 6 in. Underpinning of local stone. The first floor plan shows an entrance hall, finished in rough plaster, light terra cotta tint for walls, white frieze and ceiling, oak column for newel, with double flat arch above. Parlor finished in cream, with the walls flesh tinted, ceiling white; cornice of wood; angle fireplace of light brick. Library same as hall, with fireplace of red brick. Dining-room, also, with tinted walls, and wainscoted with beaded strips. Butler's pantry, with sink and china closet, is means of communication with kitchen, provided with the usual fixtures. Second floor divided into four chambers, large hall, and a bathroom, complete with fixtures. Attic has several rooms finished off. Cellar, cemented, contains cold room, heater and fuel storage. House was erected for Whitmell T. Taliaferro, Esq., and designed by E. Rollin Tilton, Esq., 21 State Street, New York City.

Our engraving was made direct from a photograph of the building, taken specially for the SCIENTIFIC AMERICAN.

Perspective Drawings.

Laws of perspective are laws of nature. We only know what a building is by what we can see it to be. The

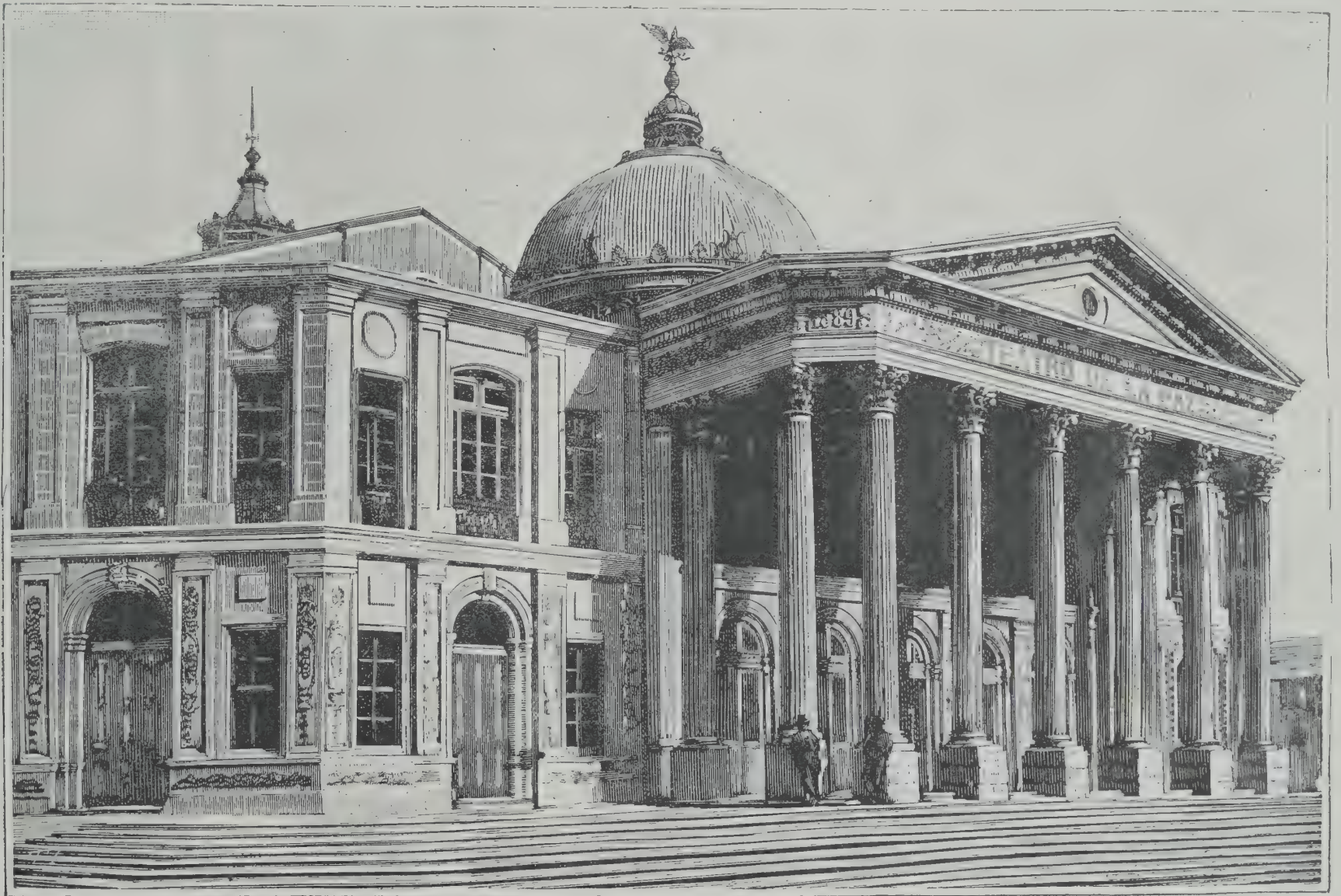
geometrical elevation presents the same breadth from top to bottom. The moment we have it in perspective, we see that the octagon is less than the square, except from certain points of view: from the four cardinal points of view, if they may be called so, a very good geometrical elevation can be obtained, but from any other point of view you do not see that effect.

Concrete Roofs.

Flat roofs have several advantages, and can conveniently be constructed of concrete, with iron or steel girders at intervals. If the under side of the concrete has to be the ceiling of the room below, it may be desirable that it should be quite flat. In this case, the necessary falls and gutters can be formed with rough concrete, laid on the top of the main body of concrete. The best material for finishing such roofs externally is asphalt.

Points of Support.

He is the ablest constructor who, with the least surface to his points of support, upholds the greatest weight, uniting strength and economy. The freemasons of the



THE NEW THEATRE, SAN LUIS DE POTOSI, MEXICO.—See page 87.

fixtures, through butler's pantry, with dresser, etc. Second floor contains four large chambers (three with fireplaces), with generous closet room, and alcoves connecting by wide plaster arches. Bathroom complete, with usual fixtures of best make. Linen closet with shelves, etc. Attic has one room finished off, and storage space. Cellar, cemented, contains hot water heater, fuel storage, etc. E. P. Sanford, Esq., builder, address previously mentioned.

Our engravings were made direct from photographs of the building, taken specially for the SCIENTIFIC AMERICAN.

A COTTAGE AT GLEN RIDGE, N. J.

We publish on page 94 the residence of F. E. Kirby, Esq., in the English half-timbered style, at Glen Ridge, N. J. The exterior is kept severely plain, being entirely devoid of mouldings, except for barge boards, and in general proportion, etc., similar to Shakespeare's cottage at Stratford-on-Avon, England. There is a well shaded front porch, with square chamfered columns, supporting the roof above, which is formed into a pediment at the entrance. The entire structure is covered with plaster, gray in color, with narrow timbers, spaced equally, and stained green. Dormers continue up from the face of the building, and relieve the severity of the gabled roof, which is covered with red slate. Chimneys of brick, capped with stone. Upper sash of windows, also the lower in bay and dormers, of leaded glass. The entrance door has upper panel divided by wooden muntions into

geometrical elevation, section and plan of that building are merely the means by which a skilled person—a scientific person or an architect—is able to lay before the builder or the public the mode by means of which he intends to carry out his primitive idea, if it is an idea at all, of the building, the perspective effect of which he has in his mind. He must, or ought to have imagined the building in perspective before he brought it upon paper. Architects' designs ought always, therefore, to be drawn in perspective. An architect, in fact, ought to think in perspective, and not think by the T-square and the drawing-board, for this is completely bringing down and reducing the function of the architect to the mere level of a simple geometrical transaction. It is not that. The architect conceives his building in his own mind first of all, but has to explain the way in which he wishes it to be executed, so as to produce a certain effect upon the beholder, and that effect can only be understood and appreciated by the laws of perspective, and by the means which every person has of looking upon a building. It is undoubtedly right and just that the architect should give the idea as he originally conceived it. Some people may say that a perspective view does not give the original conception from more than one point of view out of a thousand; that is very true, and the more perspective views the artist can get the better for the purpose. There is another great objection to presenting a building solely in elevation, as it becomes difficult for even an architect to say what the effect of certain projections will be. We know very well that every octagon put upon a square in

Middle Ages have established the principle of construction that, with equal quantities of material, a thin wall with buttresses has greater strength and stability than a thicker wall without. Piers, with equal superficies of base, as a circle, a square, an equilateral and a right-angled triangle, have the following strength approximately: 100, 93½, 86, and 76⅔. A square is to a parallelogram as 100:95. The strength of a wall depends rather upon its stability than upon the greater or less hardness of the materials. The stability of solids diminishes in proportion to the height of the centre of gravity.

Architect's Estimates.

It is one of the morals of architecture that the architect should never lead his employer into a useless expense, nor into one which his means would not enable him to afford. It is a breach of integrity which nothing can render excusable. Vitruvius records a wise law of the Ephesians. When an architect was employed upon a public work, he was required to declare the amount it would cost, and his goods were made over to the state. If the work cost one-fourth more than his estimate, it was allowed; if it were less, he was loaded with honors. But if the expenditure exceeded the prescribed limits, his property was sacrificed to make good the deficiency. It is said that Vanvitelli, having exceeded his estimate in a public work connected with the execution of one of the fountains of Rome, was mulcted in the sum of 5,000 crowns.

AN IMPROVED HOT WATER HEATER.

The Lindemuth semi-water-tube boiler, shown in the accompanying illustration, is undoubtedly one of the most efficient constructions for hot water circulation yet devised. It is the invention of H. H. Lindemuth, and is manufactured by Broomell, Schmidt & Co., of York, Pa. It is adapted to buildings in which space is limited in height, and will respond to the demand for low pressure steam or water heating, as well as elevator, hot blast, or power work. The water from the return mains enters the boiler directly opposite the hollow water back or bridge wall, passing into the water tubes unimpeded, and by natural flow ascending upwards, through the

domestic use, such as sewing machines, churns, grindstones, feed cutters, washing machines, etc. When thus operated, the same water may be returned to the pump and repeatedly used. If desired, the farmer may use the same boiler for steaming feed for stock, etc. As a substitute for windmills, this system is of special interest. Windmills are not always satisfactory, and farmers are looking for something better, that is not dependent upon the elements for power. The principle of the invention is of special interest to mechanics. It does not, as may at first be supposed, involve the principle of the steam siphon in any sense whatever, but, on the contrary, its action is more analogous to that of the condensing engine and the suction and force pump. Water is induced to flow into the pump by a vacuum produced by the admission and condensation of steam. The pump being filled with water, the water controlling check valve drops to its seat, thereby simultaneously opening the inlet steam port, whereby the water is expelled by the direct downward pressure of the steam admitted upon its surface. The water being thus displaced, the steam is condensed by a jet or spray of water, whereby a vacuum is again produced and water is again induced to enter the pump, and the operation described is again and continuously repeated, so long as the supply of steam is maintained. The pump contains no pistons, piston-rods, packing, or other delicate or complicated parts to wear out or be cut with sand. All its parts are substantial and durable, and require no more attention than an ordinary hydraulic ram. For further particulars, attention is called to the company's advertisement on another page.

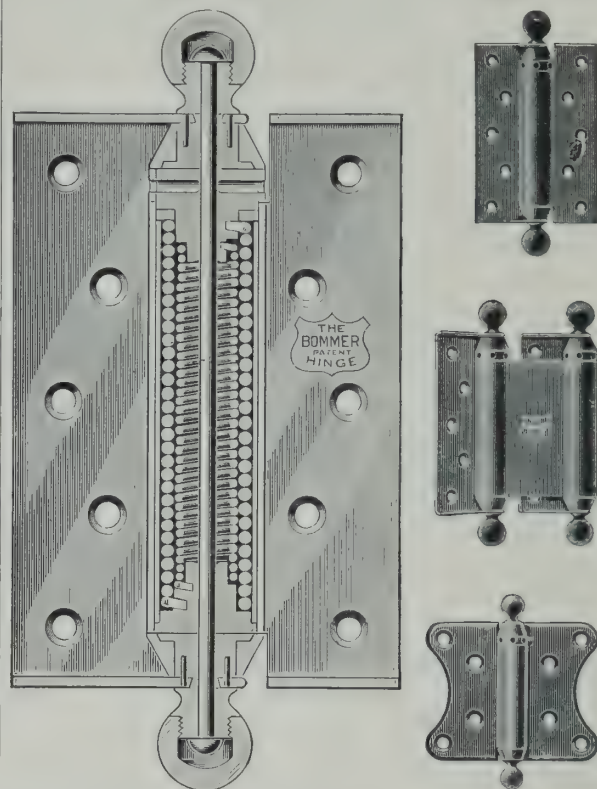
Improved Paving.

The material consists of concrete made of small lumps of emery stone set in Portland cement. The emery may be in pieces varying from half an inch in diameter down to a powder, and is mixed with Portland cement in the proportion of three parts of emery to two of cement. The composition prepared in this way is used to face ordinary concrete slabs, constituting a wearing surface for paving flags, steps, etc.

THE BOMMER SPRING HINGE.

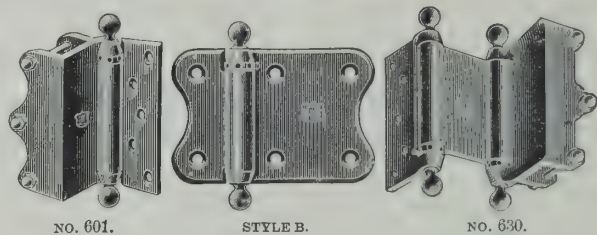
This hinge, manufactured by Bommer Brothers, 351 and 353 Jay Street, Brooklyn, N. Y., recommends itself to both the man of taste and the practical man. Among the improvements recently made in these hinges are the following: The spring barrel, in bronze and brass hinges, has an inner steel tube, extending nearly its entire length, sustaining at its upper end a heavy stationary steel washer, on which the movable tension knob has its seat, giving two horizontal and two vertical bearings, and being fitted at its lower end to a shoulder on the stationary knob, which, with the inner tube, is securely fastened to the spring barrel. The flanges have solid bushings inserted at each end, turned from machinery steel, thus making a continuous steel core through the entire hinge, reducing the wear and friction at the joints to a minimum. By compounding the springs, besides gaining power, a far more elastic, flexible, and even action is obtained, and an easy movement is given to the door. (The 14½ inch hinges have four, the 12 inch three, and all the other sizes two springs, one within the other.) The ball tips of the

hold the door open or keep it closed, as desired. They have compound springs, and are packed with bolts and screws to match. The Bommer spring hinges were



SECTIONAL CUT OF THE BOMMER PATENT HINGE.

STYLE A.



NO. 601.

STYLE B.

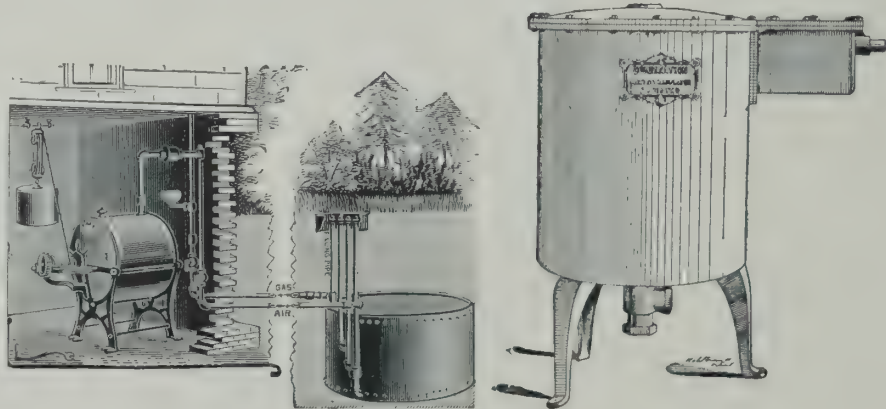
NO. 630.

awarded a medal and diploma at the World's Fair, in Chicago.

THE Cincinnati Corrugating Co. issue an elaborate catalogue, which should be in the hands of architects and builders generally. They have extensive works at Piqua, O., comprising rolling mills, galvanizing works, tin plate works and factory, and their catalogue covers descriptions of corrugated roofing, siding, ceiling, arches, lath, shutters, doors, V crimp iron roofing, standing seam plain roofing, roll and cap steel roofing, elastic joint roofing, metallic weatherboards, ridge capping, beaded metallic ceiling, roofing tin plates, and Juniata galvanized sheets, etc., all of their own manufacture.

A MIXING REGULATOR FOR GAS MACHINES.

In many places where neither city gas nor electric light is available, the use of gas machines, making gas from gasoline, has become extremely popular, and they are now considered indispensable. In order, however, to obtain a brilliant, steady light, various adjustments have been necessary from time to time to meet the changing quality of gasoline. An improvement designed to do away with this difficulty has been found in the combination mixing regulator, shown in the accompanying illustrations, and which is manufactured by the Detroit Heating and Lighting Company, of Detroit, Michigan. It is automatic in its action, and, without valves, gauges, dials or levers, renders impossible a smoky flame, and greatly reduces the cost of gas for both illumination and fuel. Once set to fit the burners, no future adjustment is required, as there is no mechanism to get out of order, and no oiling is required. When attached to cheap grade



A GAS MIXING REGULATOR.

gas machines, this regulator tends to steady as well as improve the quality of the light. The same company are the makers of the Combination Gas Machine, one of the oldest machines on the market, and one which has for more than twenty years stood in the front rank of lighting apparatus.

THE LINDEMUTH SUN SEMI-WATER-TUBE BOILER.

(FOR HOT WATER HEATING.)

tubes, as it absorbs the units of heat from combustion, and frees itself into the water space at the rear of tubes, and then passes forward over the hot crown sheet to the main water flow pipes, which are placed immediately over the fire. The fire box is directly under the flow pipes, and the action of the fire is directly upon the crown sheet, the water thus entering the boiler at a place where the temperature of the gases of combustion is the lowest, and leaving it at a point where they are the hottest, making it, therefore, one of the simplest, most durable and economical of hot water boilers.

A NEW INVENTION FOR RAISING WATER.

The engraving illustrates a new water supply system, which has recently been brought out by the Erwin Hydraulic Machinery Company, of Milwaukee, Wisconsin, adapted to be used in the suburbs of cities, country



THE ERWIN HYDRAULIC MACHINERY CO. WATER SUPPLY SYSTEM.

homes, hotels, and summer resorts. It is also adapted to supply water in large quantities for irrigation, railroad tanks, etc. The smaller sizes may be used in an ordinary bored well two inches in diameter. Wood, coal, or oil may be used for fuel, and with it water for the ordinary country home is supplied at an expense of from five to ten cents per week. It is believed that this system will remove one of the chief objections to suburban residences, and will greatly enhance their value. The illustration shows a convenient manner of locating the pump and boiler, by which arrangement the same boiler may be used for heating the house and raising water. By attaching a small motor to the water pipe, the pump is converted into an engine, which may be used as a motive power for driving a variety of small machinery for

two springs, one within the other.) The ball tips of the Bommer hinge are made in two parts, the pintle being solidly riveted on to the nipples, and the cap then screwed on and fastened, making it impossible for the ball tips to work loose or drop off. The carpenter's gauge, consisting of a raised shoulder on the upper and lower edges of the flanges, saves time in hanging a pair of double acting doors, and gives absolute certainty of a good job, as by its aid the door must swing true. Being made of wrought steel, bronze and brass, this hinge enjoys the great advantage which the toughness of wrought or rolled metal gives, and will not break. The Bommer patent surface hinges, styles A and B, and the box flanged hinges, single action No. 601 and double action No. 630, are specially designed for water closet doors swinging on marble partitions, and are made to

ADJUSTABLE SLIDING DOOR TRACK AND HANGER.

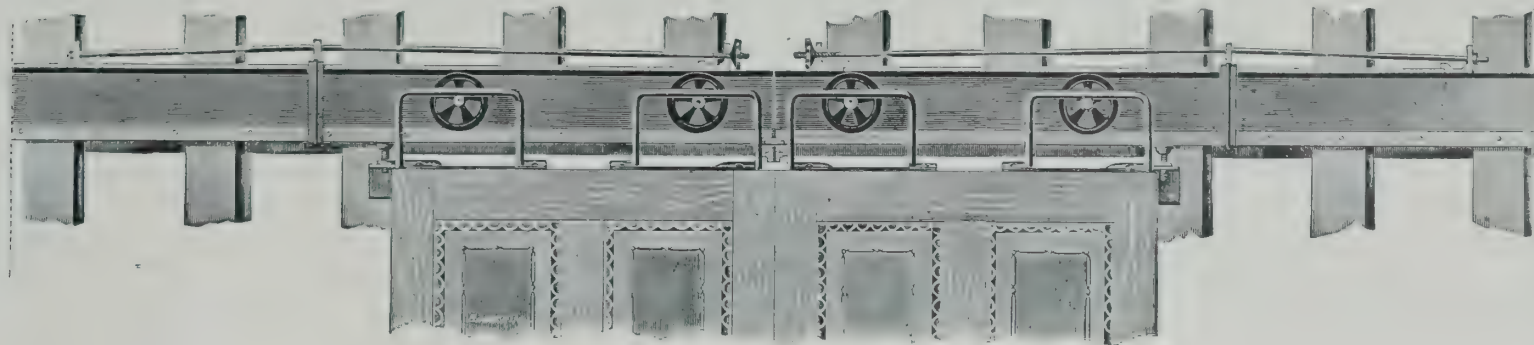
The accompanying illustration represents an adjustable sliding door track and hanger that is designed to work easily, noiselessly, and not get out of order with long use. It is manufactured by Luitink & Sons Manufacturing Co., of 673 E. Water Street, Milwaukee, Wis. The inventor of

may add that some of this African mahogany is the wood of *Khaya senegalensis*, a tree which belongs to the same family as the true mahogany, and is closely related to it. It is not so desirable a cabinet wood as the Mexican or Cuban mahogany, but is more like the Central American wood. Occasionally there are logs richly

and thus performing their full service; the extended dome, or steam chamber of the sections, at the water-line of a steam boiler, thereby increasing the liberating surface for steam, and securing a more steady water-line.

The base, or ash pit, is built of brick, having an 8 inch wall, surmounted by a 4 inch, on which will rest the bed plate to receive the sections as they shall be mounted in their places. Provisions will be made for an ash pit of 16 inches deep, which may be increased to meet the further requirements of the contractor.

The grates are single bars of triangular form, which experience has demonstrated to be most durable and economical in use.

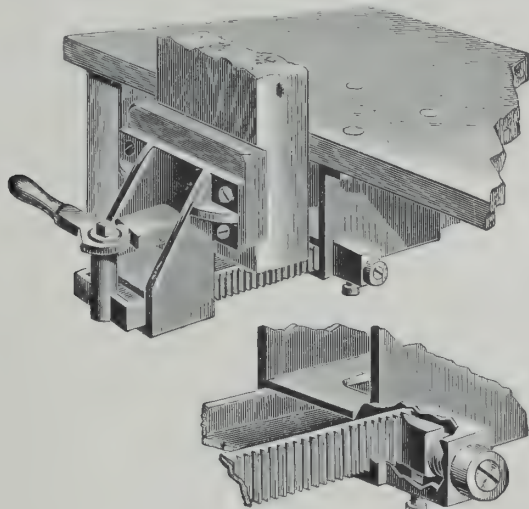


THE LUITINKS ADJUSTABLE SLIDING DOOR TRACK AND HANGER.

the Luitinks adjustable sliding door track and hanger has made the track adjustable, instead of the hanger, so that a simple, strong, non-adjustable hanger may be used, which holds the door firmly, while it runs smoothly, and with as little noise as possible. The track, being adjustable at different points, may be easily straightened and leveled, thus securing the smooth and easy running of the hanger wheels, and, at the same time, the adjacent edges of the doors are adjusted parallel with each other when closed and flush, or parallel with the jambs when open. The track can be easily straightened and adjusted, whenever it becomes necessary, by any one able to use a screw-driver, without the slightest marring or disturbing the partition or finish, and the track can be put in any old wall, without any trouble. Correspondence solicited, and estimates will be cheerfully furnished.

WOODWORKERS' IMPROVED VISE.

The illustration represents, in outline and section, an efficient vise for pattern makers, carpenters, cabinet-makers, and all woodworkers. It is manufactured by

**GLEASON'S INSTANTANEOUS POSITIVE VISE.**

Messrs. John Gleason's Sons, corner Second and Diamond streets, Philadelphia, Pa., and is extremely simple, instantaneous, and positive in its action, there being no slip. It takes work from two to eight inches, and no adjustment of any kind is necessary.

The Cortright Metal Roofing Co. have removed their main office and factory from Broad and Hamilton streets, Philadelphia, to a larger and more modern building located at 23d and Filb rt streets, Philadelphia, where better manufacturing and shipping facilities are offered for supplying the increased demand for their well-known Metal Slates, "Victoria" Shingles, etc. Customers of the company and all others interested in roofing material are requested to note the change in address, and are especially invited to send for the new 1895 Catalogue. The Western office of the company will continue at 134 Van Buren Street, Chicago, Ill.

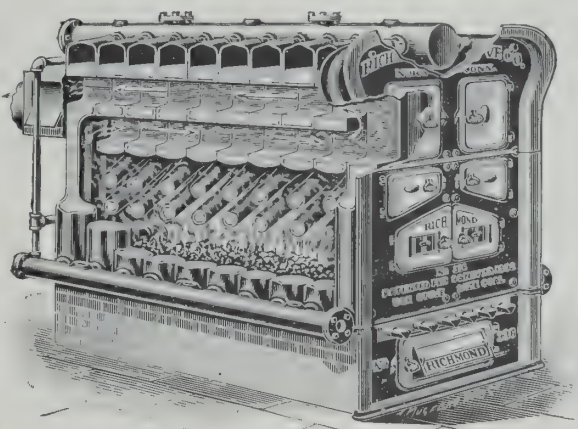
African Mahogany.

The *Southern Lumberman* says that mahogany logs from the west coast of Africa have got as far as Louisville, Kentucky, and adds that it is much cheaper than the mahogany from Central America and Cuba. From these mahogany forests in Africa it is said that twelve million feet of lumber have already been cut and exported, and they promise to yield an immense revenue to the British and French colonists who have seized upon the territory. The wood has a tinge of pink in contrast with the somewhat reddish color of the American variety, and some of the squared logs which have been imported are two by three and a half feet in size. We

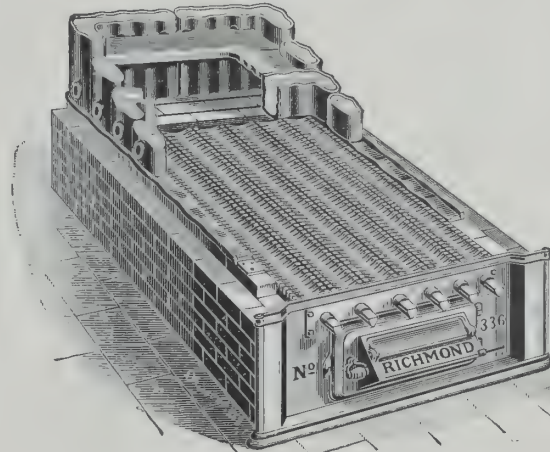
figured, and these have been manufactured here into very attractive veneering.

A NEW STEAM AND HOT WATER HEATER.

We present herewith illustrations of a new steam and hot water heater, recently patented by W. C. Higgins, of Norwich, Conn., which the Richmond Stove Company,



SECTIONAL VIEW.



ASH PIT.

A NEW HEATER BY THE RICHMOND STOVE COMPANY.

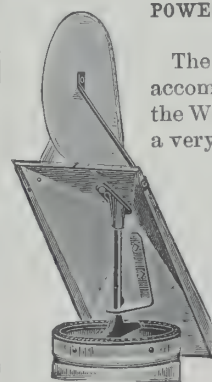
of Norwich, Conn., are about to offer in the market. It will be known as "Richmond No. 336 Sectional Heater."

Among its new features will be the form of the leg, affording a natural channel for the return water

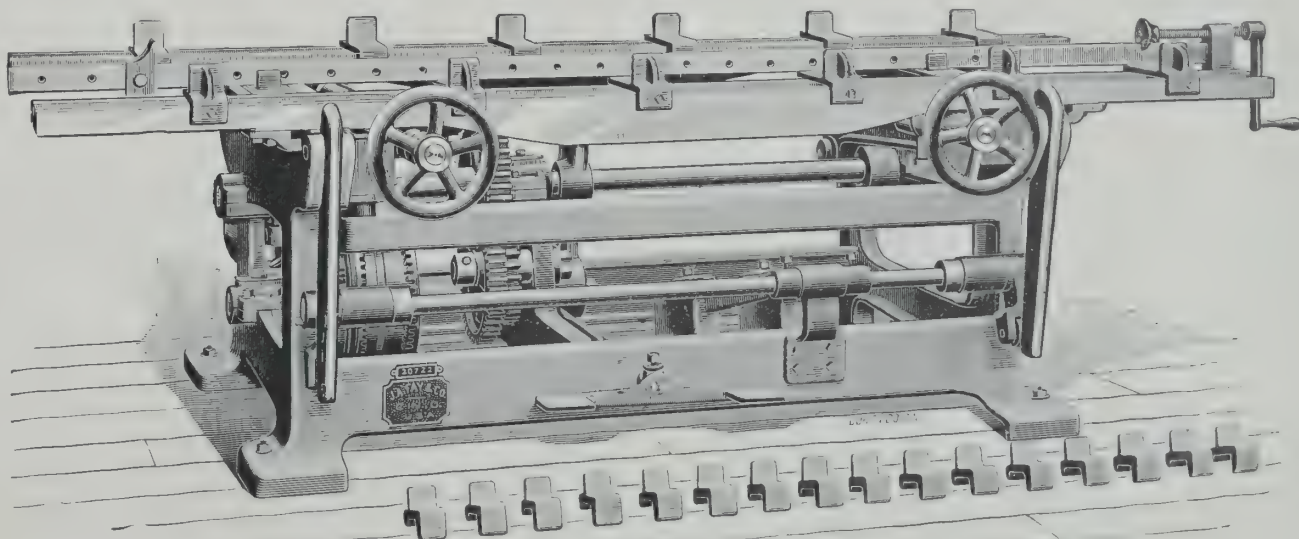
The sectional cut view shows a ten-section heater. It is claimed that the "Richmond" will be equally well adapted for hot water. The No. 336 Richmond is intended for large work, having a fire pot 36 inches wide, and from 41 to 55 inches long, according to the number of the sections. It will be made in five sizes, having grate surfaces from 1,470 to 1,980 square inches. Its claimed capacities for steam will be from 2,100 to 3,000 square feet of direct radiation; and for hot water, from 3,500 to 5,500 square feet.

POWERS' IMPROVED AUTOMATIC CHIMNEY TOP.

The improvement represented in the accompanying illustration was in use on the World's Fair buildings, and has attained a very wide popularity. It has all bearing next to cover, and is fully braced. The cover stops wind from blowing across top of stack, stops all down draughts, and prevents choking. It adjusts with the slightest pressure of the wind, and will wear a lifetime. It has iron mountings, made in three pieces. It is manufactured by Powers Bros., of Streator, Ill.

**IMPROVED WOOD-WORKING MACHINERY.**

The improvement in door and blind clamping machinery within the past few years has been very marked, but to the present time no machine had been designed that would clamp doors as rapidly as the progressive door maker desired, and the demand for a machine of increased power and capacity has been met in the substantial and perfect machine shown in the accompanying cut. The power is applied by the use of very heavy gearing, operated by a treadle placed in front, convenient to the operator. The clamping is done almost instantly, and when the cranks that convey the pressure reach their extreme throw, it is instantly released by a positive shipping device. As arranged, the greatest pressure is applied when the joint is nearly closed or when the greatest resistance must be overcome. At this point the door is held clamped until wedged. By reversing the treadle and engaging the driving mechanism, the material is released. The change in the machine to accommodate different sizes of material is made by the hand wheels and screws. The capacity of the machine is for doors to



AN AUTOMATIC DOOR AND BLIND CLAMPING MACHINE.

in a steam boiler; the large direct fire surface within the combustion chamber, and therefore exposed to the direct action of the fire; the double return flues of large areas, permitting the products of combustion to pass through the boiler to their exit in the chimney in combined form,

4 feet wide and 8 feet long in one motion, or to double the length in two motions, and the quantity of work is limited only by the skill of the operator. For further particulars address the makers, J. A. Fay & Co., 297 to 317 West Front Street, Cincinnati, O.

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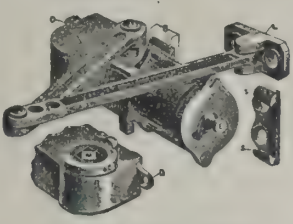
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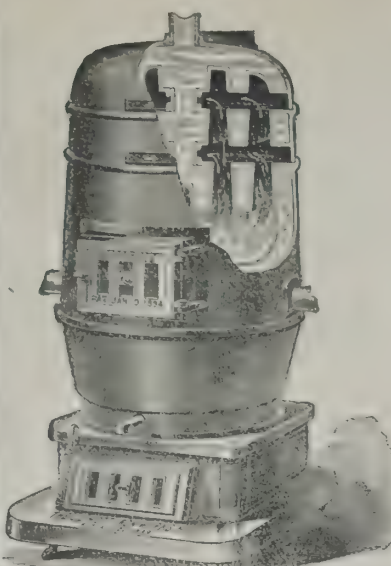
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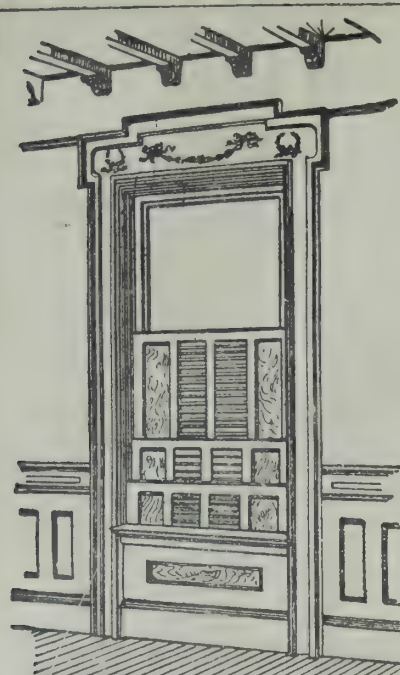
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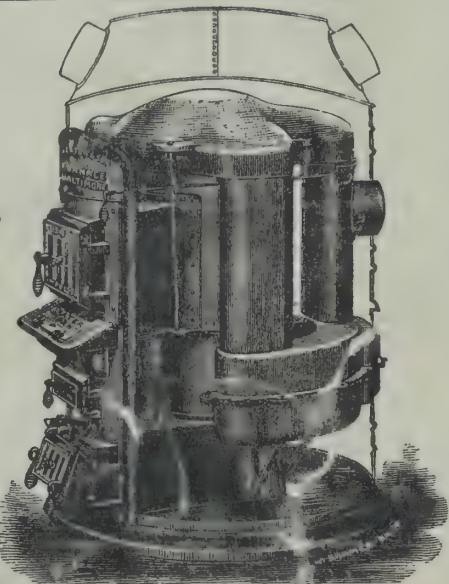
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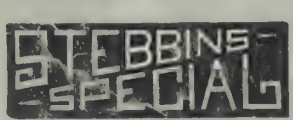
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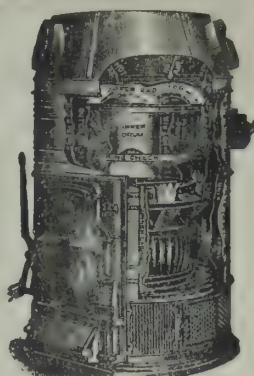
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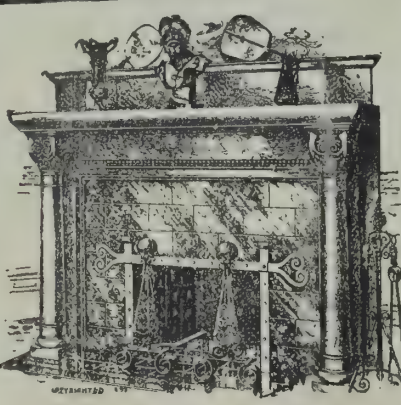
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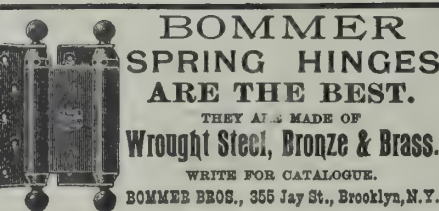
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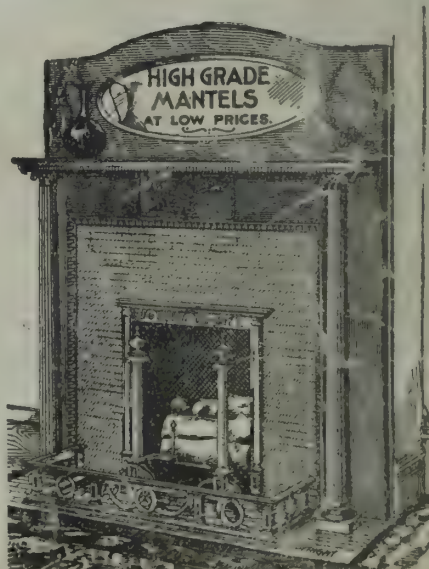


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